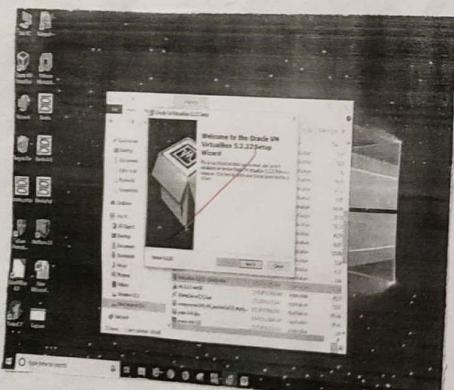
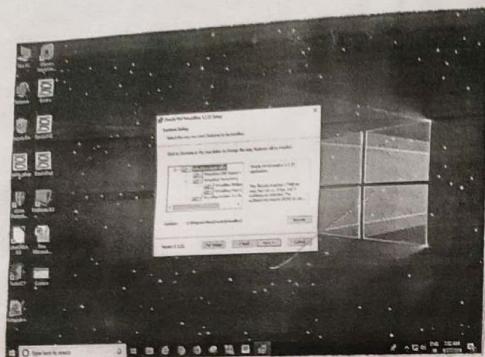


Practical no: 1

Ques:

- 1) Install your choice of linux distribution e.g. ubuntu, Fedora.
- 2) Customize desktop environment by changing different default options like changing default background, themes, screen savers.
- 3) Screen Resolution
- 4) Time settings.

Install your choice of linux distribution e.g. ubuntu, Fedora.
using a USB drive.

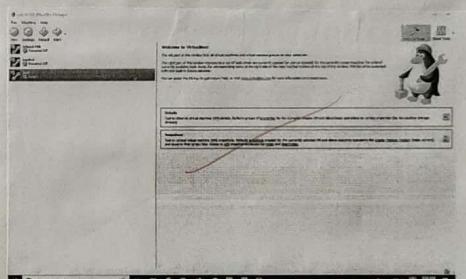
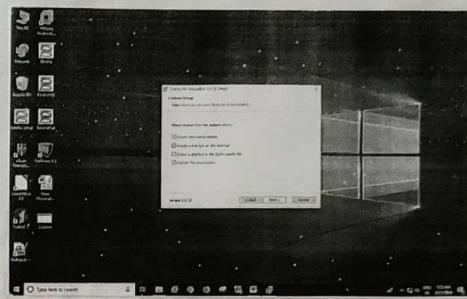
→ Most new or computers can boot from USB. You should see a welcome screen prompting you to choose your language and giving you the option to install ubuntu or try it from USB.
If your computer doesn't automatically do so, you might need to press the F12 key to bring up the boot menu, but be careful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

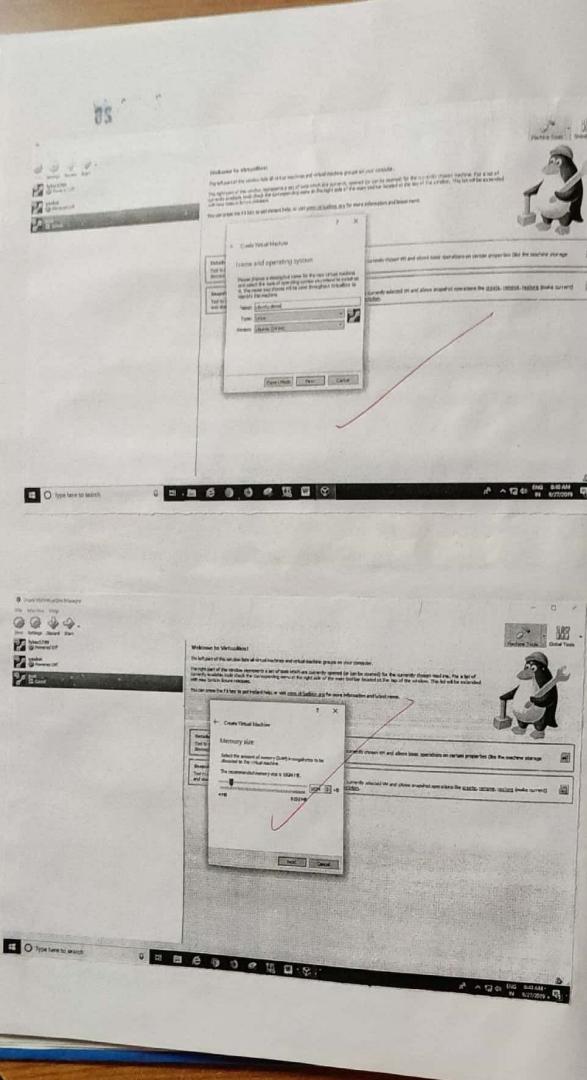
- a. To prepare to install ubuntu
- we recommend you plug your computer into a power source.
- You should also make sure you have enough space on your computer to install ubuntu.

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- Y
- R
- W E:
- A
- We advise you to select download updates while installing and install this third-party software now.
 - You should also stay connected to the internet so you can get the 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.
- b: Allocate drive space
- Use the checkboxes to choose whether you would like 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.
- c: Begin the installation.
- Depending on your previous selections, you can now verify that you have chosen the way in which you would like to install Ubuntu. The installation process will begin when you click the 'Install Now' button.
 - Ubuntu needs about 4.5 GB to install, so add a few extra GB to allow for your files.

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- a. select your location.
If you are connected to the internet, this should be done automatically. Check your location is correct and click 'Forward' 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 find it.
- Tip: If you are having problems connecting to internet, use the menu in the top right hand corner to select a network.
- b. customize desktop select your preferred key board layout;
click on the language option you need. If you are not sure, click the detect keyboard layout button for help.
- c. Enter your login and password details.
- d. learn more details about linux ubuntu while the system installs
- e. That's it.
All that left is to restart your computer and start enjoying ubuntu.
- f. Customize desktop environment by changing different default options like changing default background, themes, screensavers.

Accessing Appearance settings

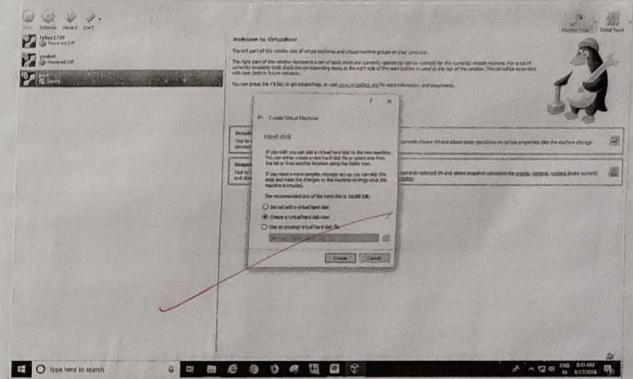
- To access appearance settings in Ubuntu, click on user menu at top right on menu bar and select system settings.

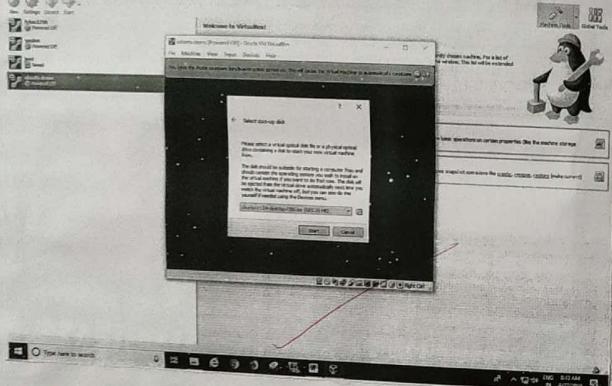
Changing wallpaper picture:

- On left side of background part, you can see your current wallpaper.
- On right side part where you select one wallpaper of ubuntu.
- If you want to select wallpaper from your picture folder, click the drop down menu above thumbnails and select the pictures folder.
- You can see all pictures in your folder as thumbnails when you select them as your wallpaper.

Changing Ubuntu theme

- Ubuntu also has option to change the desktop theme, which in one click will change the entire way your computer looks.
- To do that, click on drop-down menu below the wallpaper thumbnail, and choose between Ambiance, Radiance or High Contrast.
- Ambiance is a light theme that looks a bit more Mac-like, while Radiance is darker brown theme used in ubuntu default.





3. Screen resolution:

- You can change how big things appear on the screen by changing screen resolution.
- You can change which way up things appear by changing the rotation.
- 1. click the icon on the very right of 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.

4. Time settings:

- If you are currently in Indian time, how does the displayed time change?
- After noting the time change, change the time zone back to your local time zone.
- Just click on clock on top bar, & choose time and date settings once the time and date window opens, choose Manually, so you can change the time and date manually, otherwise choose your time zone from maps, and choose automatic.

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Practical no: 2

- 30

Ques: Installing and removing software.

a) Installing gcc package, verify that it runs and then remove it.

Step1: 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.

Step2: Type 'sudo apt-get install gcc'. After typing the following command installation will take place.

Step3: 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 have it, in particular 'gcc', so you can do

Type : cd build/gcc
sudo make uninstall

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

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Practical no : 3

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Aim: Utilization of grep, man commands.

Documentation:

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

→ 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; grep.

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

You can also scroll through pages using (Space = up) & (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 command line: Bring up the man page for the 'ls' command scroll down to the examples section.
- To use the 'man' command simply type 'man (command name)'.
Now we are going to find the manual for 'ls' command
simply type: 'man ls'.
- c) Finding man pages by topic what man pages are available that document file compression:
→ 'Tar', 'zip' are some man pages which are available for document file compression simply type:
`man zip
man tar`
- d) Finding man pages by section from the cmd line: bring up the man page for the printf lib function. which manual page section are library function found.
→ The number corresponds to what section of the manual page it formal is well command, while 8 is sys admin stuff. The man page for man itself explain it and list the std only.

There are certain terms that have different pages in different sections (e.g.: 'printf' command appears in section 1 as a 'stable' function appears in section 3); in cases like this you can pass the section no to the man command before the page name to choose which one you want or use the man -0 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 limit it.

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

→ \$ mkdir -m a=rwx directory name.

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Practical no: 4Ques: Command line operations

a) Install new package in your system.

→ sudo apt-get install (package name)

b) Remove the package installed.

→ sudo apt-get remove (package name).

c) Find the passwd file in / using ~~file~~ command.

→ v# find / -name passwd

• /usr/share/doc/nss-1.25.1/debian/passwd

• /usr/bin/passwd

• /etc/pam.d/passwd

• /etc/passwd

Find the directory passwd file under root and one level down.

find / -maxdepth 2 -name passwd

• /etc/passwd.

find the passwd file under root and 2 level down.

v# find / -maxdepth 3 -name passwd

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

Find the password file between sub-dir level 2 file.

→ # find -maxdepth 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 path name.

→ # touch example.txt
mv example.txt /tmp

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

→ # rm /tmp/example.txt

find the location of ls, ps, bash commands.

whereis ls

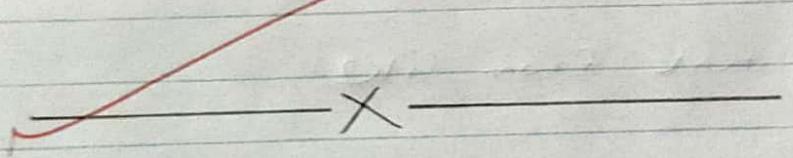
ls: /bin/ls /usr/share/man/man1/ls.1.gz

whereis ps

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

whereis bash

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



By
15/01

Practical no: 5

Aim: File operations.

1. Explore mounted file systems on your computer.

→ df -k,

2. what are the different ways of exploring mounted file systems 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 98749 4% /run
/dev/sda1 7092728 3383372 3326024 51% /
tmpfs 512076 216 511860 1% /dev/shm
tmpfs 5120 4 5116 1% /run/lock
tmpfs 512076 0 512076 0% /sys/fs/cgroup
tmpfs 102416 48 102368 1% /run/user/1000
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox:~$ mount
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
udev on /dev type devtmpfs (rw,nosuid,relatime,size=894436k,nr_inodes=123609,mode=755)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,gid=5,mode=620,ptmxmode=000)
tmpfs on /tmp type tmpfs (rw,nosuid,nodev,noexec,relatime,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,noexec,relatime)
tmpfs on /tmp type tmpfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /var/tmp type tmpfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /run type tmpfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /run/lock type tmpfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /run/user/1000 type tmpfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /sys/fs/cgroup type tmpfs (rw,nosuid,nodev,noexec,mode=755)
cgroup on /sys/fs/cgroup/systemd type cgroup (rw,nosuid,nodev,noexec,relatime,xattr,relaxatime)
cgroup on /sys/fs/cgroup/pmem type cgroup (rw,nosuid,nodev,noexec,relatime)
cgroup on /sys/fs/cgroup/pstore type cgroup (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/bikio type cgroup (rw,nosuid,nodev,noexec,relatime,bikio,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- on /proc/sys/vfs/blinfmt_misc type autofs (rw,relatime,fd=32,pgrp=1,timeout=0,nr_inodes_max=32000,allow_other)
hugetlbfs on /dev/hugepages type hugetlbfs (rw,relatime)
```

```
jeba@jeba-VirtualBox:~$ ls
documents examples.desktop 33  Music  Public  Pictures  Templates  Videos
jeba@jeba-VirtualBox:~$ cd Jeb
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$ touch gg.txt
jeba@jeba-VirtualBox:~/Jeb$ cat gg.txt
welcome
jeba@jeba-VirtualBox:~/Jeb$ cat dd.txt
welcome
Linux
jeba@jeba-VirtualBox:~/Jeb$
```

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

```
jeba@jeba-VirtualBox:~/jebS bzip2 ss.txt
jeba@jeba-VirtualBox:~/jebS ls
dd.txt ss.txt.bz2
jeba@jeba-VirtualBox:~/jebS cat ss.txt.bz2
BZh9AYSV+oPwEJH
<-->[1] jeba@jeba-VirtualBox:~/jebS gzip dd.txt
jeba@jeba-VirtualBox:~/jebS ls
dd.txt ss.txt.bz2
<-->[1] jeba@jeba-VirtualBox:~/jebS cat dd.txt.gz
<-->[1] jeba@jeba-VirtualBox:~/jebS
```

4. Archiving and backup the work directory using tar, gzip, & bzip2 commands.

→ gzip filename.txt
Bzip2 filename.txt

→ ~~use diff command to create diff of two files:
→ diff filename1 filename2~~

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

```
jeba@jeba-VirtualBox:~/jeb$ ls
aa.gz ss.txt.bz2
jeba@jeba-VirtualBox:~/jeb$ cat >aa.txt
Hello world
^C
jeba@jeba-VirtualBox:~/jeb$ cat >bb.txt
Linux
^C
jeba@jeba-VirtualBox:~/jeb$ diff aa.txt bb.txt
1d0
< Hello world
jeba@jeba-VirtualBox:~/jeb$ cat >bb.txt
^C
jeba@jeba-VirtualBox:~/jeb$ diff aa.txt bb.txt
1c1
< Hello world
^C
> this is Linux
jeba@jeba-VirtualBox:~/jeb$ gzip aa.txt
jeba@jeba-VirtualBox:~/jeb$ gzip bb.txt
jeba@jeba-VirtualBox:~/jeb$ diff aa.txt.gz bb.txt.gz
Binary files aa.txt.gz and bb.txt.gz differ
```

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

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Practical no: 6

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Q1. Use Environment.

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

```
jeba@jeba-VirtualBox:~$ w
20:35:04 up 4 min, 1 user, load average: 0.70, 0.79, 0.38
USER  TTY  FROM           LOGIN  IDLE  JCPU PCPU WHAT
jeba  tty7  :0          20:32  4:28  8.19s 0.33s /sbin/upstart
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  LOGIN  IDLE  JCPU PCPU WHAT
jeba  tty7  20:32  5:36  9.08s 0.33s /sbin/upstart --user
```

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

→ who command & whoami

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

→ cat /etc/shadow

Ans with the passwd file, each field in the shadow file is also separated with ":" colon characters are as follows.

- Username, upto 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 log in and a "*" entry indicates the account has been disabled.
- The number of days since the password was last changed.
- The number of days before password may be changed.
- The number of days after which password must

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- be charged'
- The number of days to warn user of an expiring password'
- The number of days after password expires that account is disabled.
- The no of days since January 1, 1970 that an account has been disabled'
- A reserve field for possible future w.

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

- username, upto 8 characters. case sensitive, usually all lowercase
- an "X" is the password field. Passwords are stored in the "/etc/shadow" file.
- Numeric user id: This is assigned by the "adduser" script. mix uses this field, plus the following group fields to identify which files belong to user.
- Numeric group id: Red hat uses the 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.
- User's home directory. Usually /home/username. All user's personal files, web pages, mail

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```
jeba@jeba-VirtualBox:~$ sudo cat /etc/shadow
[sudo] password for jeba:
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin/nologin
bin:x:2:2: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
```

```
jeba@jeba-VirtualBox:~$ sudo cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin/nologin
bin:x:2:2: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
```

forwarding, etc will be stored here.
user's "shell account". Often set to "bin/bash"
to provide access to the bash shell.

- Get your current working directory.
→ pwd.
- Explore different ways of getting command history
how to run previously executed command
without typing it.
→ history
! line number.
- Create alias to most commonly use commands.
→ alias command instructs the shell to replace
one string with another string while executing
the commands.

alias label = "command"

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Practical no: 7

SIM: Linux Editors: Vi

a) Create, modify, search and navigate a file in editor:

i) creating a file:

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

ii) Modifying the file:

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

iii) Search in a file:

→ To find a word (forward ^{search} press) press / followed by the word to search.

iv) Navigate:

Movement in four directions:

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

Word Navigation:

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

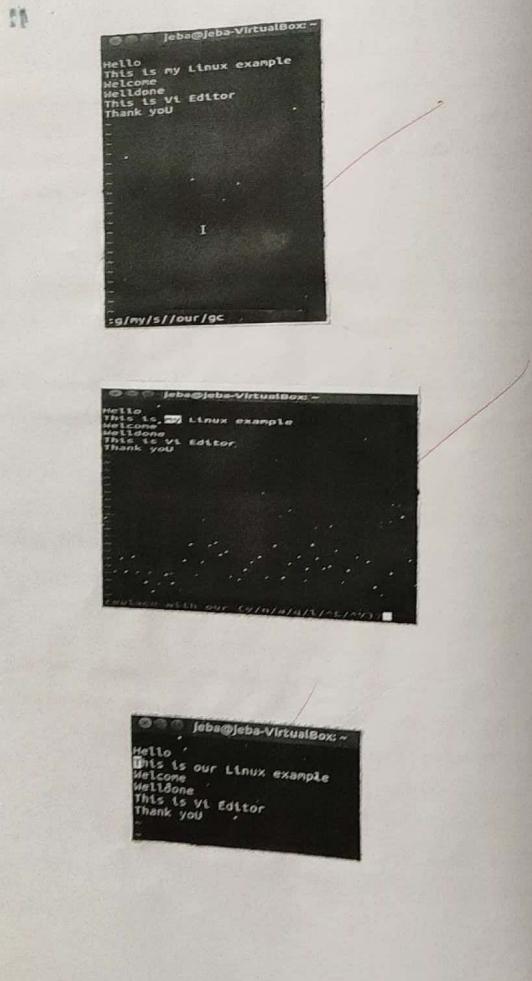
Scrolling:

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

→ Learn all essential commands like search / replace, highlight, show the line numbers

Replace

Syntax: :%g/oldword to be replaced /s!/new word /ge



- i) highlight
 - we set hlsearch
 - ii) show the line number
 - we set nu
- X



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

:set hlsearch



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

:set nu

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Practical no: 8

Sim: Linux Security

- Q) use of sudo to change user privileges to root
 → Create an user named user1
- To give some users root privilege edit /etc/sudoers file
 sudo visudo. Enter new line as highlighted below:
- Identify operations that require sudo privileges.

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

```
# Please consider adding local content in /etc/sudoers.d/ instead of
# directly modifying this file.
#
# See the man page for details on how to write a sudoers file.

Defaults    env_reset
Defaults    mail_badpass
Defaults    secure_path="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin/:
sbin:/bin"

# Host alias specification
# User alias specification
# Cmnd alias specification

# User privilege specification
root    ALL=(ALL:ALL) ALL
user1   ALL=(ALL:ALL) ALL
```

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

c) Modify expiration date for new user using 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.

```
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]: 2020-01-21
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:~$ sudo chage -E 25/01/2020 -M 10 -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:~
jeba@jeba-VirtualBox:~$ sudo userdel user1
[sudo] password for jeba:
jeba@jeba-VirtualBox:~$ su user1
... ...
No passwd entry for user 'user1'
jeba@jeba-VirtualBox:~$
```

① delete newly added user.

8
05/02

Practical no: 9

Simi Network Management.

- a) Get IP address of your machine using ifconfig.

```
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:d5a3:849e/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:~$
```

Q) Use ping to check the network connectivity to remote machines.

```
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=91.9 ms
64 bytes from maa03s28-1n-f4.1e100.net (172.217.31.196): icmp_seq=2 ttl=54 time=93.0 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=99.9 ms
^Z
[1]+  Stopped                  ping www.google.com
jeba@jeba-VirtualBox:~$
```

Q) Use of dig command.

```
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:~$
```

2) Troubleshooting network using traceroute, route command.

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

f) Use of arp command.

```
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:~$
```

g) Use of host command

```
jeba@jeba-VirtualBox:~$ host -V
host 9.10.3-p4-Ubuntu
jeba@jeba-VirtualBox:~$
```

use of netstat command and Nmap command

JOSIP

```
jeba@jeba-VirtualBox:~$ netstat
Active UNIX domain sockets (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
Active UNIX domain socket (w/o servers)
proto fcfnt 0      0      [ ]                DGRAM
unix 2          [ ]                DGRAM
 unix 2          [ ]                DGRAM
 unix 16          [ ]                DGRAM
 unix 16          [ ]                DGRAM
 unix 7          [ ]                DGRAM
 unix 3          [ ]                DGRAM
 unix 3          [ ]                STREAM CONNECTED    9684  /run/systemd/notify
 unix 3          [ ]                STREAM CONNECTED    42149  /run/user/1000/system
 unix 3          [ ]                STREAM CONNECTED    43331  @/tmp/dbus-CymTe17AQG
 unix 3          [ ]                STREAM CONNECTED    42988  @/tmp/dbus-CymTe17AQG
 unix 3          [ ]                STREAM CONNECTED    42698  @/tmp/dbus-CymTe17AQG
 unix 3          [ ]                STREAM CONNECTED    13241  /run/systemd/journal/
 unix 3          [ ]                STREAM CONNECTED    43113  /run/systemd/journal/
 unix 3          [ ]                STREAM CONNECTED    43013  /run/systemd/journal/
 unix 3          [ ]                STREAM CONNECTED    42935  /run/systemd/journal/
```

```
jeba@jeba-VirtualBox:~$ nmap www.google.com
Starting Nmap 7.01 ( https://nmap.org ) at 2020-01-28 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
DNS record for 216.58.196.68: bom05s11-1n-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:~$
```

~~Linux Shell Scripting~~

Basics of shell scripting

- To get a shell, you need to start a terminal.
 - To see what shell you have, run:
- ```
echo $SHELL
```
- In Linux, the dollar sign (\$) stands for shell variable.
  - The echo command just returns whatever you type in.
  - ~~#!/bin/bash - It is called shebang. It is written at the top of a shell script and it passes the instruction to the program /bin/bash.~~

echo \$SHELL

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

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

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

linux.sh [New File]

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

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

filename  
chmod 777 filename.sh  
.filename.sh

- 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 [You can use your favorite editor to edit the script].
  - e) chmod 777 filename.sh (for making the script executable).
  - f) sh filename.sh or ./filename.sh (for running the script).

Program to display your name.

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

Program to find the sum of two variables.

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

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

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

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

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

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

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

```
#!/bin/bash
sum=$((1+2))
echo "sum is:$sum"
```

sed :

sed command or Stream Editor is a very powerful utility offered by Linux System. It is mainly used for text substitution, find and replace but it can perform other text manipulations like insertion, deletion, search etc. With sed , we can edit complete files without actually have to open it.

Consider the following text file.

- ↳ Displaying partial text of a file.
- with sed, we can view only part, of a file rather than seeing whole file.

```

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

tcsc@tcsc-VirtualBox:~$ cat subjects.txt
Subjects offered in gk
Infrastructure
Database management
Linux
Python
green Tech
softskill
stats
calculus
computer basic

tcsc@tcsc-VirtualBox:~$ vim cs.txt
tcsc@tcsc-VirtualBox:~$ vi cs.txt
tcsc@tcsc-VirtualBox:~$ sed -n 3,5p cs.txt
Database Management
Linux
Python
tcsc@tcsc-VirtualBox:~$

```

- 2) Display all except some lines.  
 → To display all content of a file, except for some position, use option 'd'.

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

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

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

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

```
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 '/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:~$
```

5) Replace a string on a particular line. 59  
To replace a string on a particular line,  
use line number **'n'** 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'**.

- 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'.

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

- ③ Appending lines
- To add some content before every line with sed, use \* and & as follows:

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

11/02