

Practical No.1

Aim-

- * Install choice of Linux distribution e.g. Ubuntu
- * customize desktop environment by changing different default options like changing default background, themes, screensavers
- * Screen Resolution
- * Time setting

g) Initialization of Linux - Ubuntu:

Using a USB drive.

- * Most newer computer can boot from USB. See welcoming screen prompting you to choose your language and giving the option to choose your language to option install ubuntu or try it from the USB.

If your computer automatically do so, you might need to press F12 key to bring boot menu, but careful not be hold down can cause error message.

1. Prepare to install Ubuntu-

- * We recommend you plug computer into power source
- * You should also make sure you have enough space on your computer to install ubuntu.
- * You should also stay connected to internet so you can get latest update.
- * If not connected to internet, you will be asked to select wireless network during installation so we ensure your machine upto date.

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Select Linux as the type - click on type an slow down but will then click on now.

Select ubuntu as version name ubuntu should be selected by default after you set "type" value to line, select on ubuntu 64-bit before proceeding.

Click next at bottom of menu.

Select menu amount of RAM to use click and obey the slide left right to deserved on increase the amount of RAM. The need amount of RAM will be automatically select when negative.

The click on next, it's a bottom of menu.

Create your virtual machine virtual hard. The virtual hardware in section of your complete hardware space be used to machine.

click create

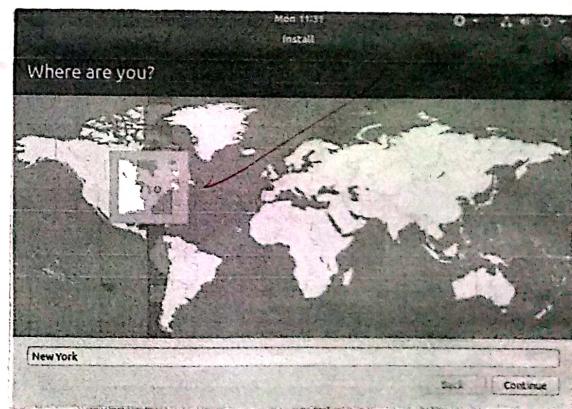
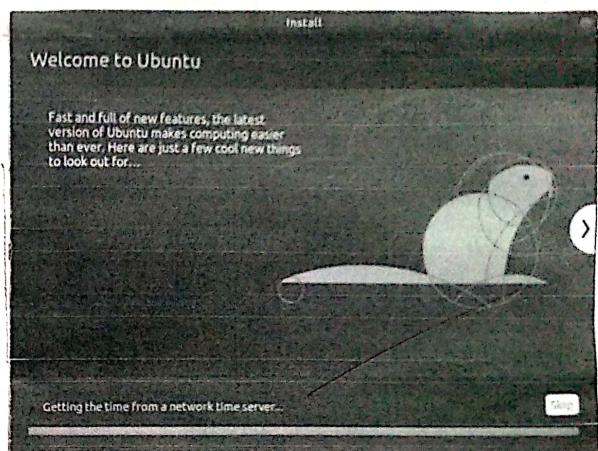
click next

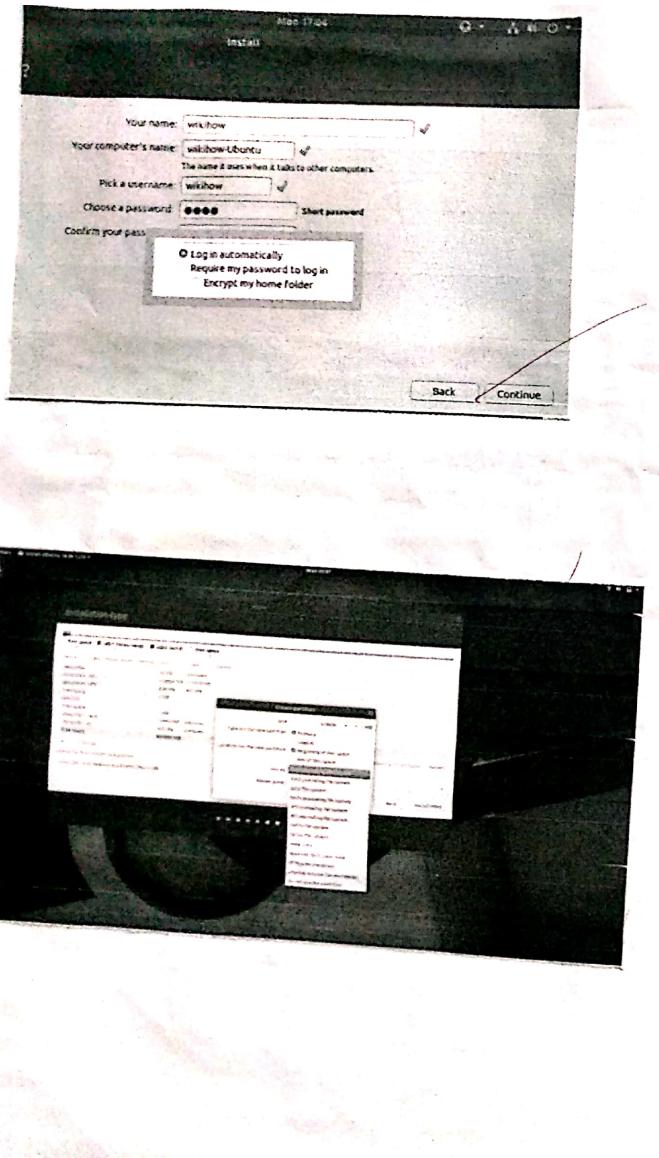
click next

select on amount of space to be used.

click create

Note size that your ubuntu is download by a create working with it.





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Customization of desktop -

Accessing appearance setting -

To access appearance setting in ubuntu, let's click on user menu at top right corner, top menu bar and select system setting.

A window will pop-up with all setting divided into parts personal, hardware, system options icons. Let's first select the appearance icon: changing wallpaper picture.

On the right side is part where we can select one of ubuntu wallpaper will be changed right way, with fading effect.

You will see me picture in your picture folders of thumb where you can select as your application.

To add wallpaper not in another folder, just click plus icon below the thumbnail and then in pop-up window, select path custom folder and choose the picture inside of it.

Changing ubuntu theme -

Ubuntu also has an option to change desktop.

PRACTICAL NO. 2.

Aim-

Installing and removing software.

a) Install GCC package, verify that it runs and then remove it.

1. First type `gcc -v` to know if you have already installed gcc compiler or not. If the output is blank then it means you do not have gcc installed.

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

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

Now to uninstall gcc compiler.

In GCC 5.1.0 although there is no `uninstall` target some direction do 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.

PRACTICAL No.3.

Aim-

Utilization of grp, m commands.

Documentations:

a)

Finding info documentation from the command is weak. the syntax the info page for grp command.

Bring up the webpage section.

To find info about any command 'info' command is weak. the syntax of info command is info command name.

We are giving to find the info about the group command. Open the terminal ($Ctrl+Alt+T$) and type:
into group.

After typing this command following output will display onto your screen.

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

Another more summarized form of showing is the man command. The command is same as info but required data

Manual Sections.

The standard sections of manual include.

- 1) User or command
- 2) System calls
- 3) C library functions
- 4) Devices and special files
- 5) File formats and conventions
- 6) Games et.al
- 7) Miscellaneous
- 8) System Administration Tools and Daemons.

~~\$ man 1 printf
\$ man 3 printf
\$ man -a printf
\$ man -k 'printf'~~
 printf (1) - format & print data
 printf (Cp) - Write formatted o/p
 printf (3) - formatted o/p conversion
~~printf [builtins] (1) - bash built-in commands, see bash(1)~~

- b) Finding man pages from the cmd 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
 Simple type : 'man ls'
- c) Finding man pages by topic - What man pages available that documents file compression
 'tar', 'zip' are some man pages which are available for document file compression simple type man tar
- d) Finding man pages by section from cmd line bring up the man page for the fprintf lib function which manual page section are library function found.

The number corresponds to what section of manual pages it form.
 '1' is user command while 8 is sysadmin stuff. The man page for man itself explain it and list the std one.

There are certain terms that have different pages in different section log, printf, as command appears in section 1 so std lib functions appears in section 31 in cases like that you own power choose which one you want or we man to show every matching page in a row.

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You can tell what section a terms fall in with man (quin) to proper commands. It will do subtracting matches. You need to use term to limit it.

e. Command line:

Help list the available options for mkdigr command

How can you do this

\$ mkdigr -m a=awx directoryname

10%
10%

PRACTICAL No. 4.

Topic- Command line operation

1) Install new package on your system.

`sudo apt-get install [package name]`

2) Remove the package installed.

`sudo apt-get remove [package name]`

3) find passwd file in/ using find command

`# find / -name passwd`

`· /usr/share/doc/nss-1.25.253/pam.d/passwd`

`· /usr/bin/passwd`

`· /etc/pam.d/passwd`

`· /etc/passwd`

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

~~`# find / -max_depth 2 -name passwd`~~

~~`· /etc/passwd`~~

~~`# find / -max_depth 2 -name passwd`~~

~~`# find / -maxdepth 3 -name passwd`~~

~~`· /usr/bin/passwd`~~

~~`· /etc/pam.d/passwd`~~

~~`· /etc/passwd`~~

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find the password file b/w sub-directories level 2 and 4

```
# find - maxdepth 3 - maxdepth 5 - name pass  
    ./. /etc /passwd /passwd
```

Create a symbolic link to file you found in step

```
# ln -s file1 file2
```

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

```
# touch example.txt
```

```
# mv example.txt /tmp
```

Delete 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/meps; /bin /ps /usr/share/man/man1/ps.1.gz

where bash

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

```
jeba@jeba-VirtualBox:~$ df -h
Filesystem      1K-blocks    Used   Available  Mounted on
udev            494436        0  494436  /dev
tmpfs           102410     3676    98740  4% /run
tmpfs           7092728 3383372  3310024  5% /
/dev/sda1        7092728 3383372  3310024  5% /
tmpfs           512076      216    511860  1% /dev/shm
tmpfs           512076       4     511076  0% /sys/fs/cgroup
tmpfs           102416      48    102368  1% /run/user/1000
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox:~$ mount -t cgroup none /sys/fs/cgroup
cgroup 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,nodev,noexec,relatime,gid=5,mode=620,ptmxmode=066)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,size=102416k,mode=755)
tmpfs on /run type tmpfs (rw,nosuid,noexec,relatime,size=102416k,mode=755)
/dev/sda1 on / type ext4 (rw,relatime,errors=remount-ro,data=ordered)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/.lock type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120k)
tmpfs on /sys/fs/cgroup type tmpfs (rw,nosuid,nodev,noexec,mode=5120k)
cgrouper on /sys/fs/cgroup/systemd type cgroup (rw,nosuid,nodev,noexec,relatime,xattr,release_agent=/lib/systemd/systemd-cgroups-agent,name=systemd,nsroot=/)
cgrouper on /sys/fs/cgroup/pstore type pstore (rw,nosuid,nodev,noexec,relatime)
cgrouper on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,cpuset,nsroot=/)
cgrouper on /sys/fs/cgroup/net_cls,net_prio type cgroup (rw,nosuid,nodev,noexec,relatime,net_cls,nsroot=/)
cgrouper on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,devices,nsroot=/)
cgrouper on /sys/fs/cgroup/memory type cgroup (rw,nosuid,nodev,noexec,relatime,memory,nsroot=/)
cgrouper on /sys/fs/cgroup/blktio type cgroup (rw,nosuid,nodev,noexec,relatime,blkio,nsroot=/)
cgrouper on /sys/fs/cgroup/perf_event type cgroup (rw,nosuid,nodev,noexec,relatime,perf_event)
cgrouper on /sys/fs/cgroup/hugepages type cgroup (rw,nosuid,nodev,noexec,relatime,hugepages,nsroot=/)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=32,pgrp=1,timeout=0,minproto=5,maxproto=5,direct)
hugepages on /dev/hugepages type hugepages (rw,relatime)
```

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

Ans: gzip filename.txt

Bzip2 filename.txt

```
jeba@jeba-VirtualBox:~/tar$ tar -cvf data.tar /mn
tar: data.tar: Cannot open: Permission denied
tar: Error is not recoverable; exiting now
jeba@jeba-VirtualBox:~/tar$ sudo tar -cvf data.tar /mn
```

```
jeba@jeba-VirtualBox:~/tar$ ls
data.tar
jeba@jeba-VirtualBox:~/tar$ rm data.tar
jeba@jeba-VirtualBox:~/tar$ dd if=/dev/zero of=ss.txt
jeba@jeba-VirtualBox:~/tar$ cp gg.txt ss.txt
jeba@jeba-VirtualBox:~/tar$ cat gg.txt
welcome
jeba@jeba-VirtualBox:~/tar$ cat ss.txt
welcome
jeba@jeba-VirtualBox:~/tar$
```

+Hello
Jeba@jeba-VirtualBox:~/tar\$

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

Ans: gzip filename.txt

Bzip2 filename.txt

```
jeba@jeba-VirtualBox:/$ tar -cvf data.tar /mn
tar: data.tar: Cannot open: Permission denied
tar: Error is not recoverable; exiting now
jeba@jeba-VirtualBox:/$ sudo tar -cvf data.tar /mn
tar: Removing leading '/' from member names
/mn/
/mn/hd/
jeba@jeba-VirtualBox:/$ ls
bin  data.tar  etc      lib      mn  opt   run  srv  usr
boot dd    home ..  lost+found  mnt  proc  sbin  sys  var
cdrom dev   .initrd.img media   mnt1  root  snap  vmlinuz
jeba@jeba-VirtualBox:/$ cat data.tar
mn/0000755000000000000000000000000013605376557010365 Sustar rootrootmn/hd/0000755000000000000000000000000013605376557010760 Sustar rootrootjeba@jeba-VirtualBox:/$
```

```
jeba@jeba-VirtualBox:~/jeb$ bzip2 ss.txt
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt  ss.txt.bz2
jeba@jeba-VirtualBox:~/jeb$ cat ss.txt.bz2
BZh91AY&SY`♦[■]♦[■]
'Jew$S♦[■]1 jeba@jeba-VirtualBox:~/jeb$ gzip dd.txt
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt.gz  ss.txt.bz2
jeba@jeba-VirtualBox:~/jeb$ cat dd.txt.gz
♦[■]♦[■]d.txt+OeIeoMeeee+♦[■]♦Xzjeba@jeba-VirtualBox:~/jeb$
```

on

ip2

5. Use diff command to create diff of two files

Ans: diff filename1 filename2

using

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```

@jeba-VirtualBox:~/jeb$ ls
aa.txt  bb.txt
@jeba-VirtualBox:~/jeb$ cat aa.txt
a world
@jeba-VirtualBox:~/jeb$ cat >bb.txt
is Linux
@jeba-VirtualBox:~/jeb$ diff aa.txt bb.txt
no world
@jeba-VirtualBox:~/jeb$ cat >bb.txt
is Linux
@jeba-VirtualBox:~/jeb$ diff aa.txt bb.txt
no world
@jeba-VirtualBox:~/jeb$ gzip aa.txt
@jeba-VirtualBox:~/jeb$ gzip bb.txt
@jeba-VirtualBox:~/jeb$ diff aa.txt.gz bb.txt.gz
try files aa.txt.gz and bb.txt.gz differ

```

file system on

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

```

@jeba-VirtualBox:~/jeb$ cat >hi.txt
.
.
.

@jeba-VirtualBox:~/jeb$ cat >hii.txt
.
.
.

@jeba-VirtualBox:~/jeb$ diff -u hi.txt hii.txt >sam.patch
@jeba-VirtualBox:~/jeb$ patch ,sam.patch
@jeba-VirtualBox:~/jeb$ patch <sam.patch
Huge file hi.txt
@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 @@
@jeba-VirtualBox:~/jeb$ 

```

ip and bzip2

the patch using

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PRACTICAL No. 5

File Operations

- 1) Explore mounted file system on your computer
⇒ `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 backup the work directory using `.tar, gzip and bzip2`
⇒ ~~`gzip filename.txt
bzip2 filename.txt`~~
- 5) Use `diff` to create diff of two files
⇒ `diff filename1 filename2`
- 6) Use `patch` command to patch a file. And analyze the patch using `patch` command again

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PRACTICAL NO. 6.

User Environment.

- a) Which account you are logged in? How do you find out?
 ⇒ who command & whoami

- b) Display /etc/shadow using cat command and understand the importance of shadow file. How its different than passwd file.
 ⇒ cat /etc/shadow.

As with passwd file, each field in shadow file is also separated with ":" colon characters, and are as follows:

- Username, up to 8 characters, case-sensitive, usually all lowercase.
- A direct match to be username in etc/passwd file.
- Password, 13 character encrypted. A blank entry (e.g. ::) indicates a password is not required to log in and :* indicates the account has been disabled.
- The number of days since last password changed.
- The number of days after which password must be changed.
- The number of days after password expires that account is disabled.
- The number of days after password expires account has been disabled.

```
jeba@jeba-VirtualBox:~$ who
jeba    tty7        2020-01-15 20:32 (:0)
jeba@jeba-VirtualBox:~$ whoami
jeba
jeba@jeba-VirtualBox:~$ who -l
LOGIN   tty1        2020-01-15 20:38          780 id=tty1
```

```
jeba@jeba-VirtualBox:~$ w
20:35:04 up 4 min, 1 user, load average: 0.70, 0.79, 0.38
USER   TTY      FROM              LOGIN@   IDLE    JCPU   PCPU WHAT
jeba    tty7     :0               20:32   4:28   0.19s  0.33s /sbin/upstart
jeba@jeba-VirtualBox:~$ w -s
20:35:14 up 4 min, 1 user, load average: 0.60, 0.77, 0.37
USER   TTY      FROM              LOGIN@   IDLE    JCPU   PCPU WHAT
jeba    tty7     :0               4:38   /sbin/upstart --user
jeba@jeba-VirtualBox:~$ w -h
jeba    tty7     :0               20:32   4:44   0.07s  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   5:30   9.08s  0.33s /sbin/upstart --user
```

```
jeba@jeba-VirtualBox:~$ sudo cat /etc/shadow
[sudo] password for jeba:
root::18240:0:99999:7:::
daemon:*:16911:0:99999:7:::
bin:*:16911:0:99999:7:::
sys:*:16911:0:99999:7:::
sync:*:16911:0:99999:7:::
games:*:16911:0:99999:7:::
man:*:16911:0:99999:7:::
lp:*:16911:0:99999:7:::
mail:*:16911:0:99999:7:::
news:*:16911:0:99999:7:::
```

```
jeba@jeba-VirtualBox:~$ sudo cat /etc/passwd
root:x:0:0:root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:12:man:/var/cache/man:/usr/sbin/nologin
lpix: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:~$ pwd
/home/jeba
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox:~$ history
1 who
2 whoami
3 who -l
4 clear
5 w
6 w -s
7 w -h
8 w -f
9 clear
10 cat /etc/shadow
11 sudo cat /etc/shadow
12 clear
13 sudo cat /etc/passwd
14 pwd
15 clear
16 history
jeba@jeba-VirtualBox:~$ 13
who -l
LOGIN tty1 2020-01-15 20:30 780 id=tty1
```

```
jeba@jeba-VirtualBox:~$ alias m="mkdir new"
jeba@jeba-VirtualBox:~$ m
jeba@jeba-VirtualBox:~$ ls
Desktop Documents Downloads Examples.desktop Music Pictures Templates
Documents Examples.desktop 11 new Public Videos
jeba@jeba-VirtualBox:~$
```

- A reversed field for possible future use.

Each field in password entry is separated with ":" colon character, as follows:

- Username : up to 8 characters, case-sensitive, lowercase
- At 'x' in password file. Passwords are stored "etc/shadow" file
- Numeric user id : Red Hat user group id is in a fairly unique for enhanced file security. Usually group id match with user id.
- Full name user. I'm not sure max. length of this field, but keep it reasonable.
- User's home directory. Usually /home/username (e.g. /home/tim). Personal file, web pages, mail, etc will be stored.
- User's shell account. Often set to "bin/bash" to provide access to bash shell

- c) Get current working directory
⇒ pwd.

- d) Explore different ways of getting command history, how to execute command without typing.
⇒ history.

1 line number.

- e) Create alias to most commonly used commands
Alias command instructs shell to replace one string with another while executing command.
alias label = " command".

PRACTICAL No.7

Linux Editor: Vi

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

i) Creating file

To create a file, on terminal type 'vi' followed by
filename:

ii) Modify the file:

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

iii) Search in a file:

To find a word press / followed by word to search.

iv) Navigate:

Movement in 4 directions:

Key Action

k Move cursor up

j Move cursor down

h Move cursor left

l Move cursor right

Word Navigation:

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```
Hello
This is my Linux example
Welcome
Welldone
This is Vi Editor
Thank you
```

```
Hello
This is my Linux example
Welcome
Welldone
This is Vi Editor
Thank you
```

```
Hello
This is our Linux example
Welcome
Welldone
This is Vi Editor
Thank you
```

```

Hello
This is our Linux example
Welcome
Welldone
This is VI Editor
Thank you

:set hlsearch
  
```

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

Scrolling

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

b) Learn all essentials command like search/ replace ; highlight show line numbers

- i) Replace
- ii) Highlight
 - Use set hlsearch
- iii) Show line numbers
 - Use set & nu

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QUESTION PAPER

Practical No. 8:

Topic - Linux Security

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

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

- b) Identify operations that require sudo privileges.
F- Expire Date:

m - minimum number of days before password change.

M - Number of days password is valid

w - Number of days warning before password change is required.

- c) Delete newly added user.

```
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
```

```
# 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
```

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

```
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
```

↑
J.D.
10/01/2020

Practical No. 9

Topic - Network Management.

- a) Get IP address of your machine using ipconfig
- b) Get hostname of your machine
- c) Use ping to check network connectivity to remote machine
- d) Use dig command
- e) Troubleshooting network using traceroute, route command.
- f) Use of arp command.
- g) Use of host command
- h) Use of netstat command and N-map command.

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```
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::80d:53a0:da3e:848e/64 Scope:link  
UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1  
RX packets:2 errors:0 dropped:0 overruns:0 frame:0  
TX packets:73 errors:0 dropped:0 overruns:0 carrier:0  
collisions:0 txqueuelen:1000  
RX bytes:1180 (1.1 KB)  TX bytes:8518 (8.5 KB)  
  
lo         Link encap:Local Loopback  
inet addr:127.0.0.1  Mask:255.0.0.0  
inet6 addr: ::1/128 Scope:Host  
UP LOOPBACK RUNNING  MTU:65536  Metric:1  
RX packets:53240 errors:0 dropped:0 overruns:0 frame:0  
TX packets:53240 errors:0 dropped:0 overruns:0 carrier:0  
collisions:0 txqueuelen:1  
RX bytes:4225072 (4.2 MB)  TX bytes:4225072 (4.2 MB)
```

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

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

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```
jeba@jeba-VirtualBox:~$ dig www.google.com
;; global options: +version
;; options: +nocmd
;; Query time: 0.029 ms
;; SERVER: 127.0.1.1#53 (127.0.1.1)
;; REFRESH: 0s
;; RECURSION-PROMPT: 0s
;; EDNS(0) version: 0; flags: rd; udp: 4096;
;; message size: 512
;; ANSWER SECTION:
www.google.com. 300 IN A 172.217.166.100
;; Query time: 0.029 msec
;; SERVER: 127.0.1.1#53 (127.0.1.1)
;; WHEN: Mon Jun 29 20:40:06 2020
;; MSG SIZE rcvd: 59
```

```
jeba@jeba-VirtualBox:~$ traceroute www.google.com
traceroute to www.google.com (172.217.166.100), 30 hops max, 60 byte packets
1  192.168.2.2 (192.168.2.2)  81.196 ms  81.143 ms  81.151 ms
2  *
3  192.168.2.2 (192.168.2.2)  68.568 ms  68.486 ms  68.485 ms
```

```
jeba@jeba-VirtualBox:~$ route
Kernel IP routing table
Destination     Gateway         Genmask        Flags Metric Ref    Use Iface
default         *               0.0.0.0       UG    0      0        0 enp0s3
192.168.2.0    *               255.255.255.0 U     0      0        0 enp0s3
link-local     *               255.255.0.0   U     1000  0        0 enp0s3
```

```
jeba@jeba-VirtualBox:~$ arp
Address          Hwtype Hwaddress          Flags Mask           Iface
192.168.2.2      ether  52:54:00:12:35:02  C             enp0s3
```

```
jeba@jeba-VirtualBox:~$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type            State          I-Node Path
unix 2      [ ]        DGRAM           42149          /run/user/1000/system
d/notify
unix 2      [ ]        DGRAM           9694           /run/systemd/journal/
syslog
unix 1e     [ ]        DGRAM           9695           /run/systemd/journal/
dev-log
unix 7      [ ]        DGRAM           9704           /run/systemd/journal/
socket
unix 3      [ ]        DGRAM           9684           /run/systemd/notify
unix 3      [ ]        STREAM           CONNECTED      44042          @/tmp/dbus-CymTei7AQG
unix 3      [ ]        STREAM           CONNECTED      43331          @/tmp/dbus-CymTei7AQG
unix 3      [ ]        STREAM           CONNECTED      42988          @/tmp/dbus-CMGGc6G7P5
unix 3      [ ]        STREAM           CONNECTED      42690          @/tmp/dbus-CMGGc6G7P5
stdout
unix 3      [ ]        STREAM           CONNECTED      13242          /run/systemd/journal/
stderr
unix 3      [ ]        STREAM           CONNECTED      43113          /run/systemd/journal/
fdout
unix 3      [ ]        STREAM           CONNECTED      43013          /run/systemd/journal/
fderr
unix 3      [ ]        STREAM           CONNECTED      42935          /run/systemd/journal/
```

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```
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): 218.68.68.68; bon05s11-in-f4.1.e100.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 No. 10.

Topic - 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) #!/bin/bash - called shebang. written at top of shell script and it passes through instructions of program /bin/bash.

Echo \$SHELL.

vi filename.sh

#!/bin/bash

echo "This is Linux!"

Chmod 777 filenamech

/filename.sh.

Steps to write & execute a shell script.

~~Shell script is just a simple text, with .sh extension using cd command executable permission.~~

Open Terminal

Navigate place where you want to create script using cd command

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

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

"linux.sh" [New File]

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

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

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

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

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

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

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

- c) Touch filename.sh
d) vi filename.sh. [I can use editor to edit the script]
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 sum of 2 variables.

```
vi filename.sh
#!/bin/bash
```

a=100

b=25

Sum=\$((a+b))

echo "sum is : \$sum"

Program to find sum of 2 numbers. (parsed during execution).

ANSWER.

Sed.

Sed command or Stream Editor is very powerful utility offered by Linux system. It is mainly for text substitution, find & replace but it can perform other text manipulation like insertion, deletion etc with sed, we can edit complete file 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 rather than seeing whole file.

2) Display all except some lines.

To display all content for some portion, option 'd'

3) Deleting a line.

use line number by 'd'

4) Search and Replacing a string

's' option for searching a word.

5) Replace string on particular line.

use line number 's' option.

6) Add a line after/before matched string
use option 'a'

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

```
tcsc@tcsc-VirtualBox: $ vi cs.txt
tcsc@tcsc-VirtualBox: $ Sed -n 3,5p cs.txt
database management
linux
python
```

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

```
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 '/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/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: $
```

```
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
```

use option 'i' also

7) To change a whole line with matched pattern
use option 'c'

8) Appending lines -
we 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
```

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