

Practical -1

- Aim:-**
- i) Install your choice of linux distribution of ubuntu, fedora;
 - ii) Customize desktop environment by changing different default options like changing default background, themes, screen savers.
 - iii) Screen resolution
 - iv) Time settings.

Procedure (i).

Step-1:- Install virtual box.

Step-2:- Open Virtual box:- i.e double click Virtual box application.

Step-3:- Click yes (New). It's a blue box in the upper left column of the virtual box window.

Step-4:- Enter a name of your Virtual machine. Type whatever variable should be its name and it should be in single quotes.

Step-5:- Select Linux as the type and scroll down and click Ubuntu 64 bit.

Step-6:- Click next and select the amount of ram through use.

Step-7:- Then click no next at the bottom of the menu.

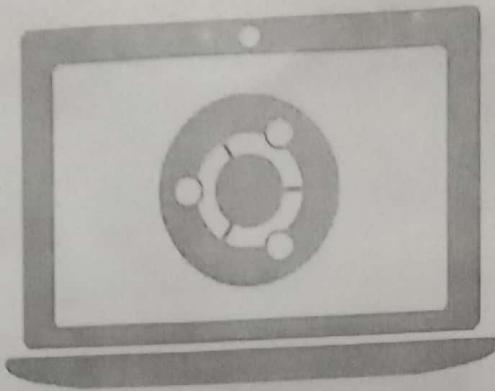
Step-8:- Create your virtual machine. Virtual hard drive which will be used to store your virtual machine program.

Step-9:- Click create, next and again next

Step-10:- Make sure that your ubuntu is download by a create working with it



Try Ubuntu

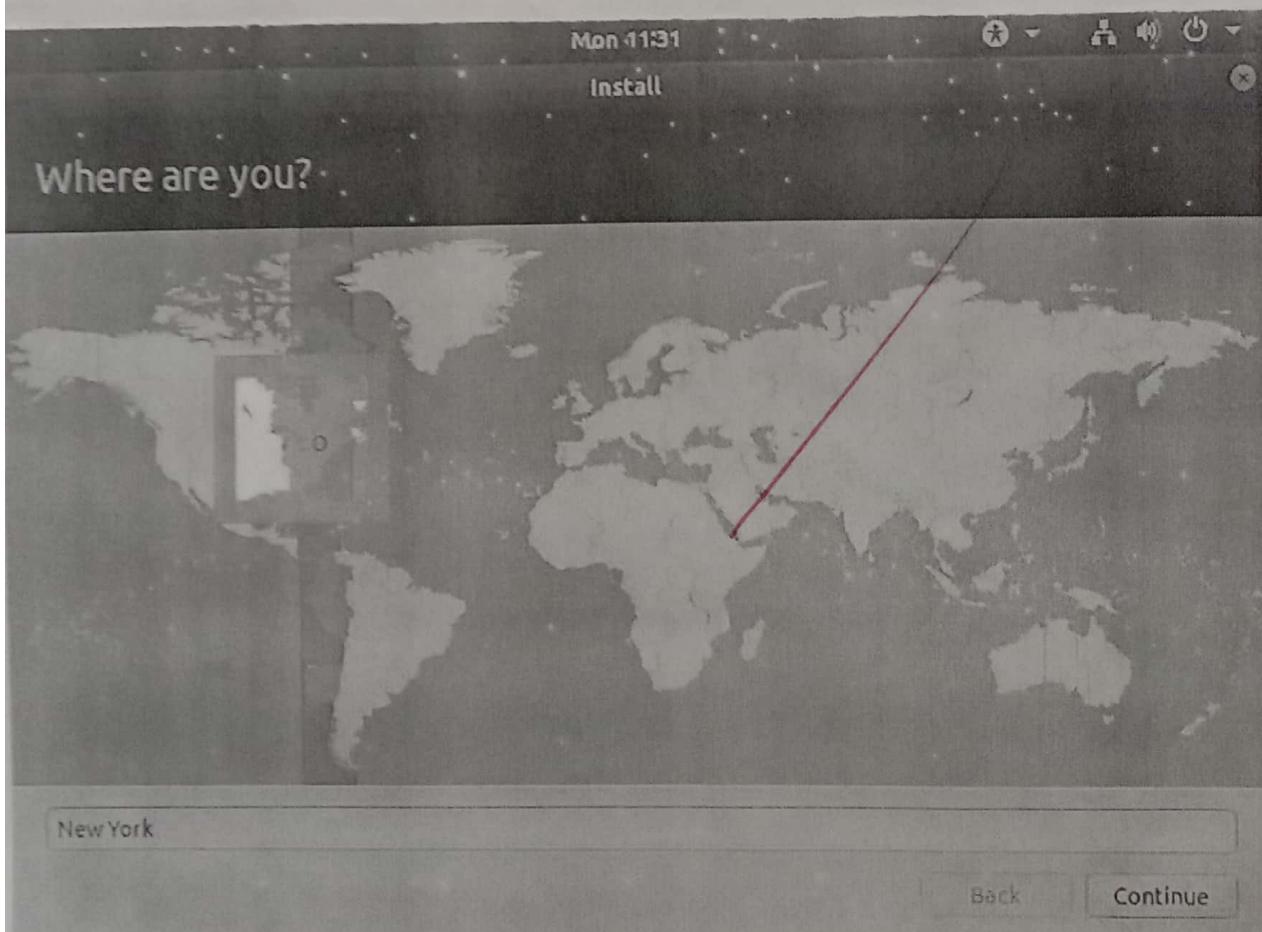


Install Ubuntu

You can try Ubuntu without making any changes to your computer, directly from this CD.

Or if you're ready, you can install Ubuntu alongside (or instead of) your current operating system. This shouldn't take too long.

You may wish to read the [release notes](#).



Customization of desktop:

Accessing appearance setting:-

To access 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.

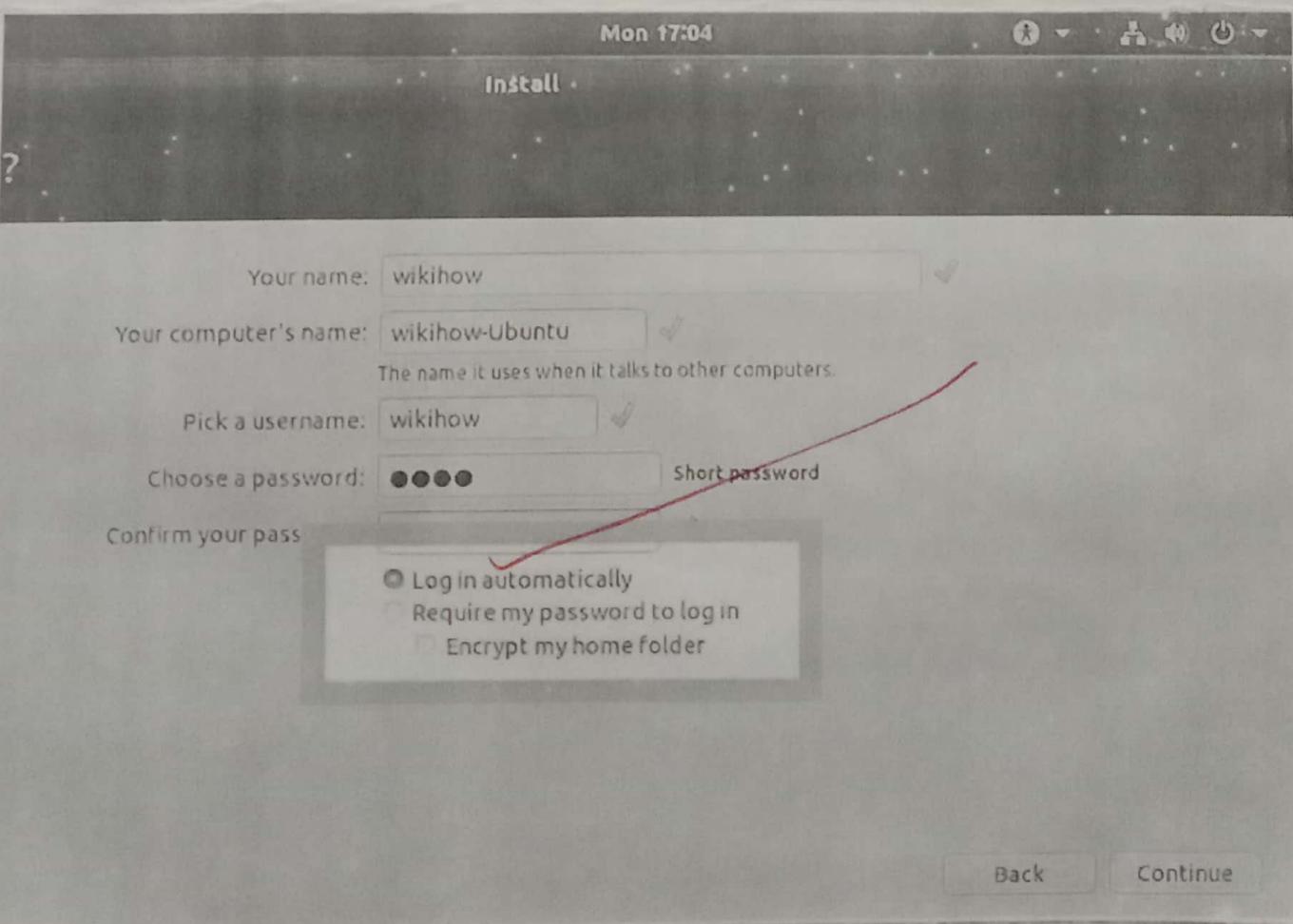
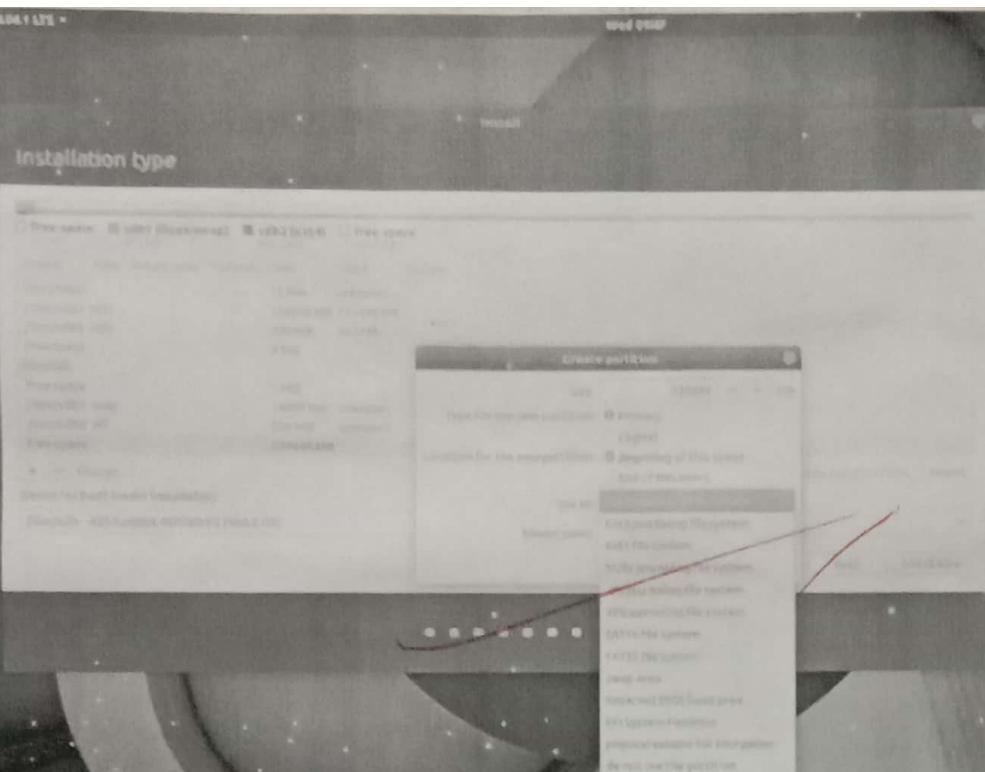
On the right side is part where we can select one of ubuntu wallpaper will be changed right way, with fading effect.

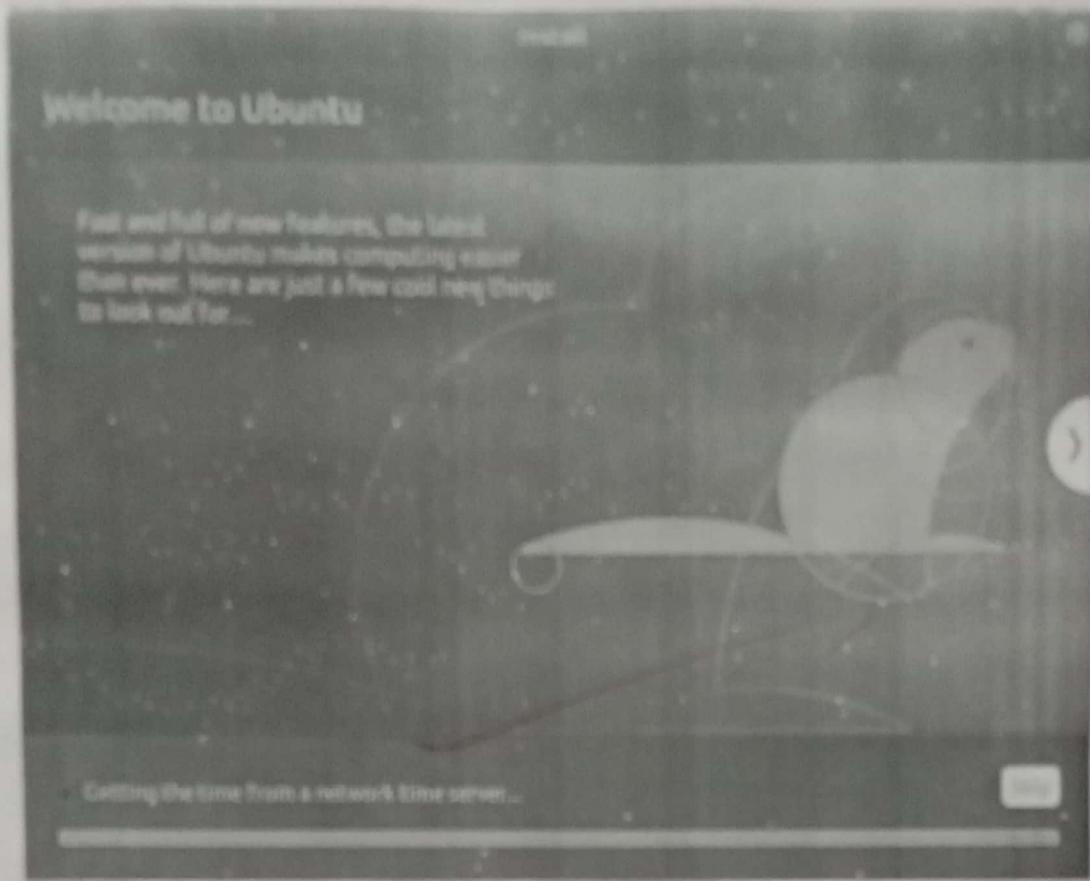
You will see one picture in your picture folder or thumb where you can select of your application.

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





Practical - 2Aim: Installing and removing Software

Q) Install gcc packages. Verify that it runs and then remove it.

Step: 1 →

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

Step: 2 → Type "sudo apt-get install gcc". After typing that the following command installation will take place.

Step: 3 →

Type 'sudo apt-get install build-essential'. This will installed all the libraries required for c and c++ programming language.

NOW TO UNINSTALL GCC COMPILER

In GCC 5.1.0, although there is no top-level uninstall target, some directories do have it, in particular gcc, so you can do:

Type: cd build/gcc
sudo make uninstall

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

Aim:-

Utilization of grep.m.commands.

Documentation:

- a) Finding info documentation from the command in which the syntax the info page for grep command.
Bring up the wage section.

To find info about any command info command or check the syntax of info command in info command name.

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

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

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

Another more summarized form of showing in the 'man' command The command in same file info dot required data

Manual Sections.

40

The standard sections of manual include.

- 1) User command.
- 2) System calls.
- 3) C library functions.
- 4) Devices and special files.
- 5) file formats and conventions.
- 6) Conventions
- 7) Miscellaneous
- 8) System Administration tools and Daemons,

- b) finding name from the cmd line bring up the man page for the ip command scroll down to the examples section.
- To use the "man" command simply type 'man (command and name)' Now we are going to find the manual for the 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 documents file compression simple type man zip.
- d) finding man pages by section from cmd line bring up the man page for the print 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 3 is sysadmin stuff. The man page for man itself explain it and list the std ones.
- ~~There are certain terms that have different pages in different section log, printf, at command appears in section 2 so std lib function appears in section 31 in cases like that you can past the words which on you want or use man -o to show every matching page in a row~~

format printf

format 3 printf

format 4 printf

format - % printf

printf () - format of print data

printf (fp) - write formatted o/p

printf (s) - formatted o/p conversations.

printf [built-in] (c) - built-in command, no library

you can tell what section a term fall in
with man (equivalent to proper commands)
It will do subtracting matches too
you need to use O term to limit it.

Command line

Help list the available options for mkdir
command How can you do this.

\$ mkdir -m a=rwx directory name.

g
p
a=rwx

Practical -4

Command Line Operations:-

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 passwd file in / using find command.

`# find / -name passwd`

- /usr/share/doc/nss-ldap-253/pam.d/passwd
- /usr/bin/passwd
- /etc/pam.d/passwd
- /etc/passwd

d) 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.

`# find / -maxdepth 3 -name passwd`

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

→ find the password file below sub-directories
level 2 & 4.

find -maxdepth 3 -maxdepth 5 -name passwd
-l /usr/local/bin/passwd
-l /etc/pam.d/passwd

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

ln -s file1 file2.

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

touch example.txt
mv example.txt /tmp/

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

Hukou's bark.

44

bark: (bin/bark/ete/bark/bark/red/share/man

/man / bark. 1.92.

~~B.P.
1/20/01~~

1) Explore mounted file system on your computer

Ans: df -h

```
jeba@jeba-VirtualBox:~$ df -h
Filesystem      1K-blocks    Used Available Use% Mounted on
udev              494436       0   494436   0% /dev
tmpfs             102416   3676   98740   4% /run
/dev/sda1        7092728 3383372  3326024  51% /
tmpfs             512076    216   511860   1% /dev/shm
tmpfs              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:~$
```

2) What are the different way of exploring mounted file system on Linux?

Ans: mount

③ Copying text from file

Ans:- cp command, mv command

```
jeba@jeba-VirtualBox:~/jeb$ bzip2 ss.txt
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt ss.txt.bzz
jeba@jeba-VirtualBox:~/jeb$ cat ss.txt.bzz
BZh91AY&SY`•[•]•[•]
'JewSSeo•[•] jeba@jeba-VirtualBox:~/jeb$ gzip dd.txt
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt.gz ss.txt.bzz
jeba@jeba-VirtualBox:~/jeb$ cat dd.txt.gz
•[•]•[•]d.txt+OeIeeMeee+•[•]•Xzjeba@jeba-VirtualBox:~/jeb$
```

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

Ans:- gzip filename.txt
Bzip2 filename.txt

5) Use diff command to create diff of two files.

Ans diff filename1 filename2

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

```
jeba@jeba-VirtualBox:~/Jobs$ cat >hi.txt
ht
ht
ht
^C
jeba@jeba-VirtualBox:~/Jobs$ cat >hi1.txt
Hello
Hello
Hello
^C
jeba@jeba-VirtualBox:~/Jobs$ diff -u hi.txt hi1.txt >sam.patch
jeba@jeba-VirtualBox:~/Jobs$ patch -s sam.patch
^C
jeba@jeba-VirtualBox:~/Jobs$ patch -s sam.patch
patching file hi.txt
jeba@jeba-VirtualBox:~/Jobs$ cat sam.patch
--- hi.txt      2020-01-08 22:14:55.463509834 +0530
+++ hi1.txt     2020-01-08 22:15:16.259898738 +0530
@@ -1,3 +1,3 @@
-hi
-hi
-hi
+Hello
+Hello
+Hello
jeba@jeba-VirtualBox:~/Jobs$
```

```
jeba@jeba-VirtualBox:~/jeb$ ls  
dd.txt.gz ss.txt.bz2  
jeba@jeba-VirtualBox:~/jeb$ cat >aa.txt  
hello world  
^C  
jeba@jeba-VirtualBox:~/jeb$ cat >bb.txt  
this is linux^C  
jeba@jeba-VirtualBox:~/jeb$ diff aa.txt bb.txt  
1d0  
< hello world  
jeba@jeba-VirtualBox:~/jeb$ cat >bb.txt  
this is Linux  
^C  
jeba@jeba-VirtualBox:~/jeb$ diff aa.txt bb.txt  
1c1  
< hello world  
---  
> 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
```

Practical = 6

Use Environment.

- a) Which account you are logged in? How do you find out?

Ans:- 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.

Ans:- cat /etc/shadow

As with the passwd file, each field in the 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 the username in the /etc/passwd file.
- Password, 13 character encrypted. A blank entry (e.g.::) indicates a password is not required to log in (usually a bad idea) and a "*" entry (e.g.:*) indicates the account has been disabled.

~~The number of days (since January 1, 1970) since the password was last changed~~

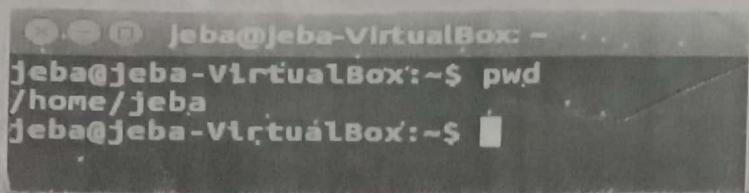
- The number of days before password may be changed (0 indicates it may be changed at any time).
- The number of days after which password must be changed (99999 indicates user can keep his or her password unchanged for many many years).
- The number of days to warn user of an expiring password (7 for a full week).
- The number of days after password expires that account is disabled.

1990-1991
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2013-2014
2014-2015
2015-2016
2016-2017
2017-2018
2018-2019
2019-2020
2020-2021
2021-2022
2022-2023
2023-2024

- The number of days since January 1, 1970 that an account has been disabled.
- A reserved field for possible future use.

- Each field in a password entry is separated with ":" colon characters, and are as follows:
- Username, upto 8 characters. Case-sensitive, usually all lowercase
 - An "x" in the passwd field. Passwords are stored in the "/etc/shadow" file.
 - Numeric user id. This is assigned by the "adduser" script. Unix uses this field, plus the following group field, to identify which files belong to the user.
 - Numeric group id. Red Hat uses 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/simone). 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).

Q) Get your current working directory.
Ans:- `pwd`



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

d) Explore different ways of getting command history, how to run previously executed command without typing it.
Ans:- `history`.
`!line number`.

e) Create alias to most commonly used commands.

~~Ans:-~~ Alias command instructs the shell to replace one string with another string while executing the command
Ans:- alias label = "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: ~$
```

Practical -7

Linux Editors

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

i) Creating a file.

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

ii) Modifying the file

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

iii) Search in a file.

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

iv) Navigate:

Movement in four directions.

Key	Action
K	Moves cursor up
J	Moves cursor down
H	Moves cursor left
L	Moves cursor right.

Word Navigate

Key	Action
b	Moves back to the beginning of the word
e	Moves forward to the end of the word
w	Moves forward to the beginning of the word
0(Go to)	Moves to first character of a line
#	Moves to the end of line

Scrolling

key	Action
ctrl+f	scroll forward
ctrl+b	scroll backward
ctrl+d	scroll half page
ctrl+u	scroll half page backward

8) Learn all essential commands like search/replace, highlight
Show line numbers.

i) Replace.

Syntax: - :g/g/word to be replaced/s/new word/gc

```
:g/my/s//our/gc
```

```
replace with our, ex/p/a/a/l/c/e/a/c
```

ii) Highlight

use set hlsearch

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

:set hlsearch
```

A screenshot of a terminal window on a Linux system. The window title is "jeba@jeba-VirtualBox ~". It displays the following text:
Hello
This is our Linux example
Welcome
Welldone
This is VI Editor
Thank you
At the bottom of the window, the command ":set hlsearch" is visible. A red arrow points from the handwritten note "use set hlsearch" to this command.

iii) Show the line number

use set nu

```
1. 1
2 Hello
3 This is our Linux example
4 Welcome
5 Welldone
6 This is VI Editor
7 Thank you

:set nu
```

A screenshot of a terminal window on a Linux system. The window title is "jeba@jeba-VirtualBox ~". It displays the following text:
1. 1
2 Hello
3 This is our Linux example
4 Welcome
5 Welldone
6 This is VI Editor
7 Thank you
At the bottom of the window, the command ":set nu" is visible. A red arrow points from the handwritten note "use set nu" to this command.

Practical-8

Linux Security

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

```
jebajeba-VirtualBox:$ tar -cvf data.tar /mn
tar: data.tar: Cannot open: Permission denied
tar: Error is not recoverable; exiting now
jebajeba-VirtualBox:$ sudo tar -cvf data.tar /mn
tar: Removing leading '/' from member names
/mn/
/mn/hd/
jebajeba-VirtualBox:$ ls
bin  data.tar  etc      lib       man  opt   run   srv  usr.
boot dd      home    lost+found  mnt  proc  sbin  sys  var.
cdrom dev      initrd.img media    mnt1  root  snap  [ ]  vmlinuz
jebajeba-VirtualBox:$ cat data.tar
mn/00007550000000000000000013605376557010365 Sustar rootrootmn/hd/000075500000
000000000000000013605376557010760 Sustar rootrootjebajeba-VirtualBox:$
```

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

```
# 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:/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

54

```
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 dates for new user using passwd aging

```
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
```

-E: Expiration Date

- m : Minimum number of days before password change
- M : Number of days password is valid.
- w : Number of days of warning before a password change is required.

d) Delete newly added user.

10
11/02

Practical - 9

Network Management.

a) Get IP address of your machine using ifconfig

```
jeba@jeba-VirtualBox:~$ ifconfig  
enp0s3      Link encap:Ethernet HWaddr 08:00:27:0e:6b:69  
            inet addr: 10.0.2.15 Bcast: 10.0.2.255 Mask: 255.255.255.0  
            inet6 addr: fe80::c0cd:53a0:d5a3:848e/64 Scope: Link  
            UP BROADCAST RUNNING MULTICAST MTU: 1500 Metric: 1  
            RX packets: 2 errors: 0 dropped: 0 overruns: 0 frame: 0  
            TX packets: 73 errors: 0 dropped: 0 overruns: 0 carrier: 0  
            collisions: 0 txqueuelen: 1000  
            RX bytes: 1180 (1.1 KB) TX bytes: 8518 (8.5 KB)  
  
lo         Link encap: Local Loopback  
            inet addr: 127.0.0.1 Mask: 255.0.0.0  
            inet6 addr: ::1/128 Scope: Host  
            UP LOOPBACK RUNNING MTU: 65536 Metric: 1  
            RX packets: 53240 errors: 0 dropped: 0 overruns: 0 frame: 0  
            TX packets: 53240 errors: 0 dropped: 0 overruns: 0 carrier: 0  
            collisions: 0 txqueuelen: 1  
            RX bytes: 4225072 (4.2 MB) TX bytes: 4225072 (4.2 MB)
```

b) Get hostname of your machine

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

c) Use ping to check the network connectivity to remote machine.

56

```
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:~$
```

d) Use of dig command

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

e) Troubleshooting networks using traceroute, route command

```
jeba@jeba-VirtualBox:~$ traceroute www.google.com
traceroute to www.google.com (172.217.106.100), 30 hops max, 80 byte packets
1 10.0.2.2 (10.0.2.2) 0.196 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:~$
```

```
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:~$
```

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

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

```
jeba@jeba-VirtualBox:~$ nmap www.google.com
```

```
Starting Nmap 7.01 ( https://nmap.org ) at 2020-01-20 22:51 IST
Nmap scan report for www.google.com (216.58.196.68)
Host is up (0.044s latency).
Other addresses for www.google.com (not scanned): 2404:6800:4007:811::2004
rDNS record for 216.58.196.68: bom05s11-in-f4.1e100.net
Not shown: 998 filtered ports
PORT      STATE SERVICE
80/tcp    open  http
443/tcp   open  https

Nmap done: 1 IP address (1 host up) scanned in 20.32 seconds
```

~~Practical = 10~~

Aim:- Shell scripting

Basics of shell scripting

- a) To get a shell, you need to start a terminal
- b) To see what shell you have, run: echo \$SHELL
- c) In linux, the dollar sign (\$) stands for shell var
- d) The echo command just returns whatever you type.
- 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

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

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

tcsc@tcsc-VirtualBox:~

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

Step to write and execute a shell script.

Shell script is just a simple text file with .sh ext. 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) \$ 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"

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

```
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:~$
```

Program to find the sum of two variables

vi filename.sh

#!/bin/bash

a=100

b=25

sum=\$((a+b))

Echo "sum is: \$sum"

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

```
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:~$ █
```

Program to find the sum of two number
(values passed during execution)

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

```
tcsc@tcsc-VirtualBox:~$ vi linux2.sh  
tcsc@tcsc-VirtualBox:~$ chmod 777 linux2.sh  
tcsc@tcsc-VirtualBox:~$ ./linux2.sh  
Sum is:125  
tcsc@tcsc-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 manipulation like insertion, deletion, search, etc. with sed, we can edit complete files without actually having to open it.

Consider the following text file

```
tcsc@tcsc-VirtualBox:~$  
cts offered in cs  
structure  
database management  
nux  
python  
green tech  
softskill  
stats  
calculus  
computer basic  
:  
:wq
```

1) 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 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  
calclus  
computer basic  
tcsc@tcsc-VirtualBox:~$
```

3) Deleting a line

To delete a line, use line number 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:~$
```

Search and Replacing a string.
'g' option is for searching a word.

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

5) Replace a string on a particular line
To replace a string on a particular line number with 'g' option.

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

6) Add a line after/before the matched string.
To add a new line with 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
calclus
computer basic
tcsc@tcsc-VirtualBox:~$
```

To add a new line with some content before every pattern match, use option 'i'. 62

```
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:~$
```

7) 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
```

8) 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
```