

PRACTICAL - 01 . . .

Aim

- : 1. Install your choice of linux distribution eg. ubuntu, Fedora
- 2. Customize desktop environment by changing different default options like changing default background, themes, screensavers
- 3. Screen Resolution
- 4. Time Settings.

STEPS TO INSTALL OPERATING SYSTEM IN VIRTUAL BOX.

- The first step is to come choose the installing language.
- Choose a language.
- A screen appears showing how prepared you are for installing ubuntu. If you are using a laptop make sure your computer is either plugged in or has enough battery life. We recommended you connect.
- There are two check boxes at the bottom of the screen choose whether to install updates as you go.
- Then choose whether to install 3rd party software. If you have a fast enough internet connection.
- Click continue.

- The installation type screen asks you how you wish to partition the hard drive.
- Select Erase disk and install ubuntu
- Click install now.
- The installation begins and the files are copied to the virtual hard drive.
- Click the map to choose your location
- choose the language for your keyboard.

→* Customize desktop environment by changing different default options like changing default background themes, screen savers. Accessing appearance settings.

→ To access appearance settings in Ubuntu, let's click on the menu at the top right corner, on the top menu bar and select system settings.

→ A window will pop-up with all settings divided into personal, hardware and system options icons.

→ Let's first select the appearance icon.

* Changing wallpaper picture.

→ On the left side of Background part, you can see your current wallpaper.

→ On the left side of background part, you can see your current wallpaper.

- If you want to select wallpaper from your Picture folder, click the drop down menu above thumbnails and select the Picture Folder.
- You will see all the pictures in your Pictures folder as thumbnails, where you select them as wallpaper.
- To add wallpaper that is in another folder, just click the plus icon below the thumbnails and then in popup window select the path to our custom folder and choose picture inside it.

Changing Ubuntu Theme

- Ubuntu has an option to change the Desktop theme, which is one click will change the entire way your computer looks.
- To do that, click on the dropdown menu below the Wallpaper thumbnails and choose between Ambiance, Radiance or High Contrast.
- Ambiance is a light theme that looks a bit more Mac-like, while Radiance is the darker brown theme and used in Ubuntu by default.

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Time settings change the time zone of your system to (or New York Time)

- 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 the clock on the top bar, choose Time & Date Settings, once the Time and Date window opens, choose Manually, so you can change the time & date manually, otherwise choose your time zone from the map, choose Automatic.



40))

1:45 AM



Abed



Wednesday, 25 September 2013

• September •

◀ 2013 ▶

Sun Mon Tue Wed Thu Fri Sat

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	1	2	3	4	5
6	7	8	9	10	11	12

Time & Date Settings...


2013

PRACTICAL - 02

Aim : Installing and removing Software

a] Install gcc package, verify that runs and then remove it

Step 1 :

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

Step 2 :

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

Step 3 :

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

NOW TO UNINSTALL GCC COMPILER

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

Type : cd build/gcc
sudo make uninstall

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

✓
✓
✓
✓

PRACTICAL - 03

Aim : Utilization of grep, man commands

Documentation :

a) Finding info documentation from the command line: bring up the info page for the grep command. Bring up the usage section.

Ans: To find info about any command 'info' command is used the syntax of info command is "info (command name)".

We are going to find the info about the 'grep' command:

Open the terminal (ctrl + alt + T) and type:
info grep

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

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

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

.na, --all, do not ignore entries starting with .
. -A, --almost all - do not list implied &
. d, --directory.

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list entries instead of contents & do not
defer symbolic link.

f -- classify -append indicator (on of * 1=>@1)
to entries

Man zip :

- add - update existing entries & add new files if the archive does not exist create it. This is default mode.
- freshen (f) - update existing entries of an archive if need on the file system does not add new files to the archive.
- delete (-d) - Select entries in an existing archive & delete them.
- copy (-u) select entries in an existing archive & copy them in new archive.

Man Tar :

- no . ad - disable the pos1 x ACIS support
- add file : add given file to the archive
(useful - fits names start with dash)
- anchored - pattern match file name starts
- b , -- blocking - factor blocks

blocks ~~x 512 bytes / sec.~~

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 method]

c) Find the passwd file in / using find command

find / -name passwd

- /usr/share/doc/nss-1dap-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 1-max depth 2-name passwd

- /etc /passwd

find the passwd file under root and 2 level
down

find 1-max depth 3-name passwd

- /usr /bin /passwd

- /etc /pam -d /passwd

- /etc /passwd

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

find -maxdepth 3-maxdepth 5-name passwd

- /usr /bin /passwd

- /etc /pam -d /passwd

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

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

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

```
# touch example.txt
```

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

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

```
# rm /tmp/example.txt
```

g) 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

PRACTICAL - 5

~~File Operations~~

1. Explore mounted file systems on your computer

~~df -k~~

~~10/10~~

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

~~mount~~

3. Copying text from files

~~cp command , mv command~~

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

~~gzip filename.txt~~

~~Bzip2 filename.txt~~

```
jeba@jeba-VirtualBox:~$ df -k
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:~$ 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=494436k,nr_inodes=123609,mode=755)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,gid=5,mode=620,ptmxmode=000)
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)
tmpfs on /run/lock type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120k)
tmpfs on /sys/fs/cgroup type tmpfs (ro,nosuid,nodev,noexec,mode=755)
cgroup on /sys/fs/cgroup/systemd type cgroup (rw,nosuid,nodev,noexec,relatime,xattr,release_agent=/lib/systemd/systemd-cgroups-agent,name=systemd,nsroot=/)
pstore on /sys/fs/pstore type pstore (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/blkio type cgroup (rw,nosuid,nodev,noexec,relatime,blkio,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-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=32,pgrp=1,timeout=0,minproto=5,maxproto=5,direct)
hugetlbfss on /dev/hugepages type hugetlbfss (rw,relatime)
```

```
jeba@jeba-VirtualBox:~$ ls
Desktop      Downloads      Music      Public      Videos
Documents  examples.desktop  jj  Pictures  Templates
jeba@jeba-VirtualBox:~$ cd jeb
jeba@jeba-VirtualBox:~/jeb$ cat .gg.txt
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$ cat >gg.txt
welcome
Linux
^C
jeba@jeba-VirtualBox:~/jeb$ touch dd.txt
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt  gg.txt
jeba@jeba-VirtualBox:~/jeb$ cp gg.txt dd.txt
jeba@jeba-VirtualBox:~/jeb$ cat dd.txt
welcome
Linux
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$
```

5. Use diff command 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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25%

PRACTICAL - 6

User Environment

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

who command & whoami

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

cat /etc/shadow

As with the passwd file, each field in the shadow file is also separated with ":" colons 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 (eg. ::) indicates a password is not required to log in (usually a bad idea) and a "*" entry (eg. :*:*) indicates the account has been disabled.

```
jeba@jeba-VirtualBox:~  
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 20:30  
jeba@jeba-VirtualBox:~$ █ 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    8.19s  0.33s /sbin/upstart -  
jeba@jeba-VirtualBox:~$ w -s  
20:35:14 up 4 min, 1 user, load average: 0.60, 0.77, 0.37  
USER      TTY      FROM          IDLE 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    9.00s  0.33s /sbin/upstart --user
```

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

- Username, upto 8 chars. 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 ids 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 max length for this field is, but try to keep it reasonable (under 30 chars)
- User's home directory. Usually /home/username (eg /home/jsmith). 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 favourite shell)

c) Get your current working directory

pwd

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

history

!line number

e) Create alias to most commonly used commands

Alias command instructs the shell to replace one string while executing the commands.

~~alias label = "command"~~

89
20/01

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

```
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:~$ !3  
who -l  
LOGIN      tty1          2020-01-15 20:30  
jeba@jeba-VirtualBox:~$ █  
780 id=tty1
```

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

PRACTICAL - 7

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 'o'

iii) Search in a file :

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

iv) Navigate :

Movement in four directions

key

k

j

h

l

Action

Moves cursor up

Moves cursor down

Moves cursor left

Moves cursor right .

Word Navigation 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 (zero)	Moves to first char of a line
\$	Moves to the end of line.

Scrolling

	Action
Ctrl + f	scrolls forward
Ctrl + b	scrolls backward
Ctrl + d	scrolls half page
Ctrl + u	scrolls half page backward.

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

i) Replace

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

ii) Highlight

Use set hlsearch

03

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

I

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

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

Replace with our (v/n/a/q/t/c/e/o/s) ?
```

b) Le

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

i)

ii)

iii) Show the line number

Use set nu

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

:set hlsearch
```

```
jeba@jeba-VirtualBox: ~
1 Hello
2 This is our Linux example
3 Welcome
4 Welldone
5 This is Vi Editor
6 Thank you

:set nu
```

PRACTICAL -8

Linux Security

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

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

- b) Identify operations that require that
require sudo privileges.

jeba@jeba-VirtualBox:~
[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.

d) Delete newly added user.

```
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:~$
```

```
jeba@jeba-VirtualBox:~$ sudo chage -E 25/01/2020 -m 10 -M 90 -I 30 -W 30 user1
jeba@jeba-VirtualBox:~$ sudo chage -l user1
Last password change : Jan 21, 2020
Password expires     : Apr 20, 2020
Password inactive    : May 20, 2020
Account expires       : Jan 01, 2022
Minimum number of days between password change : 10
Maximum number of days between password change : 90
Number of days of warning before password expires : 30
jeba@jeba-VirtualBox:~$
```

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

PRACTICAL - 9

Network Management

- a) Get IP address of your machine using ifconfig
- b) Get hostname of your machine
- c) Use ping to check the network connectivity to remote machines.

```
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)
```

```
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
```

sa

d) Use of dig command

e) Troubleshooting network using traceroute, route command

f) Use of arp command

g) Use of host 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.
;
; 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:~$
```

```
jeba@jeba-VirtualBox:~$ traceroute www.google.com
traceroute to www.google.com (172.217.166.100), 30 hops max, 60 byte packets
1 10.0.2.2 (10.0.2.2) 0.190 ms 0.143 ms 0.151 ms
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:~$ arp
address          Hwtype  HWaddress          Flags Mask           Iface
0.0.2.2          ether   52:54:00:12:35:02  C            enp0s
```

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

Use of netstat command & Nmap command.

netstat -an
or
netstat -an | grep "LISTENING"
netstat -an | grep "ESTABLISHED"
netstat -an | grep "TIME_WAIT"
netstat -an | grep "CLOSE_WAIT"

netstat -an | grep "LISTENING" | awk '{print \$5}' | sort | uniq -c

netstat -an | grep "ESTABLISHED" | awk '{print \$5}' | sort | uniq -c

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 variable .
- d) The echo command just returns whatever you type in .
- e) #!/bin/bash - It is called shebang . It is written at the top of a shell script and it passes the instruction to the program /bin/bash

Echo \$SHELL

• vi filename.sh
#!/bin/bash
echo " THIS IS LINUX!"

• chmod 777 filename.sh
• ./filename.sh

Step to write and execute a shell script.

Shell script is just a simple text file with .sh extension, having executing 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)

05

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

"linux.sh" [New File]

```
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: $
```

15

Program to display your name.

```
#!/bin/bash
```

```
Echo "Enter your name: "
```

```
Read name
```

```
Echo "My name is: $name"
```

Program to display your sum of two variables

```
vi filename.sh
```

```
#!/bin/bash
```

```
a=100
```

```
b=25
```

```
Sum=$((a+b))
```

```
Echo "sum is : $sum"
```

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

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

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

Sed

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

Consider the following text file.

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

Prog
pass

```
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"  
  
lin.sh" 3 lines, 46 characters
```

Sed
: Sed
Uti
Us
ca
in
lc
tc

CE

1) Displaying partial text of a file.

With sed, we can view only part of a file rather than seeing whole file.

2) Display all except some lines.

To display all content of a file except for some position use option 'd'.

3) Deleting a line

To delete a line, use line numbers followed by 'd'.

4) Search & Replacing a string

```
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: $ 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: ~

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

:wq

tcsc@tcsc-VirtualBox: ~

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

tcsc@tcsc-VirtualBox:~\$ sed 3,5d cs.txt

```
subjects offered in cs  
datastructure  
green tech  
softskill  
stats  
calclus  
computer basic  
tcsc@tcsc-VirtualBox: ~
```

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: ~
```

- 5) Replace a string on a particular line
 To replace a string on a particular line, use line number with 's' option.
- 6) Add a line after/before the matched string.
 To add a new line with some content after every pattern match, use option 'a'.
 To add a new line with some content before every pattern match, use option 'i'.
- 7) To change a whole line with matched patterns.
 To change a whole line to a new line when a search pattern matches, use option 'c'.
- 8) Appending Lines

To add some content before every line with sed, use * and & as follows.