OPERATING SYSTEMS

LAB DIGITAL ASSIGNMENT - 1

Course Code : SWE3001 Slot : L25+L26

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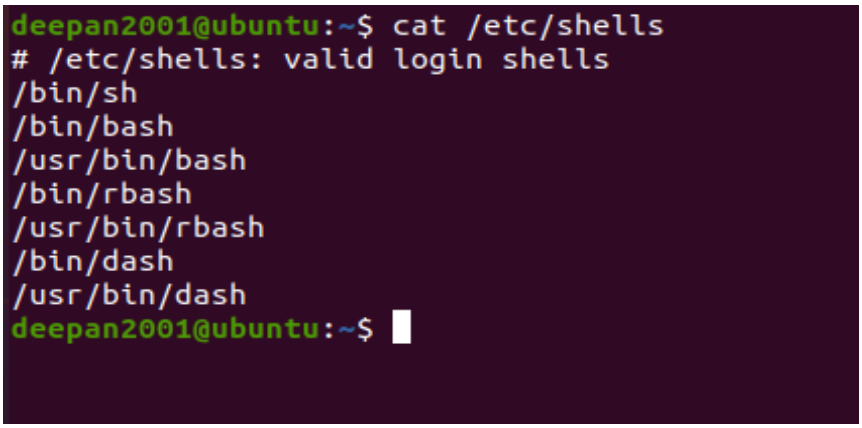
Reg No : 19MIS0102

To find all available shells in your system, use the following command:



To find the shell type following command :

Study of Linux & Windows Shell Commands :

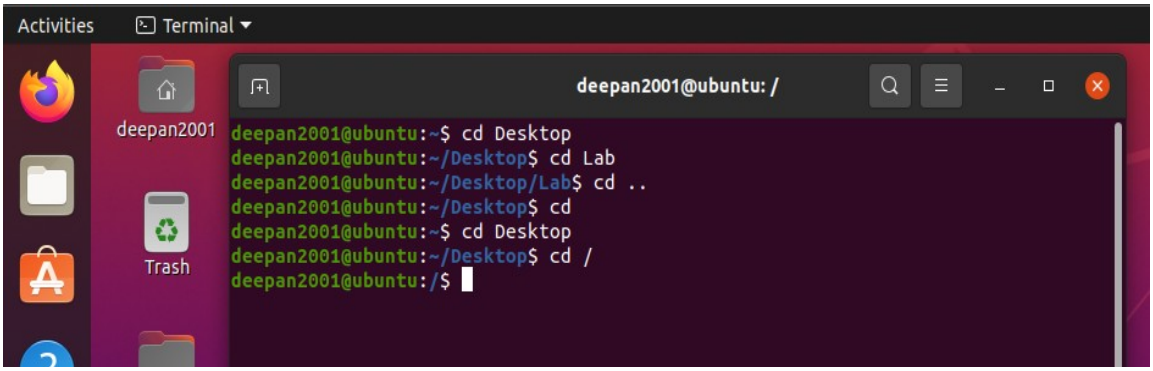
1) cd :

'cd' means 'change directory'.

Typing: cd /[directory name] will get us into one of the main directories.

Typing cd ..will get us out of it. (move to parent directory.) Typing cd without the / and a sub-directory name will get into that subdirectory.

If we type just: cd we'll go back to our home directory.



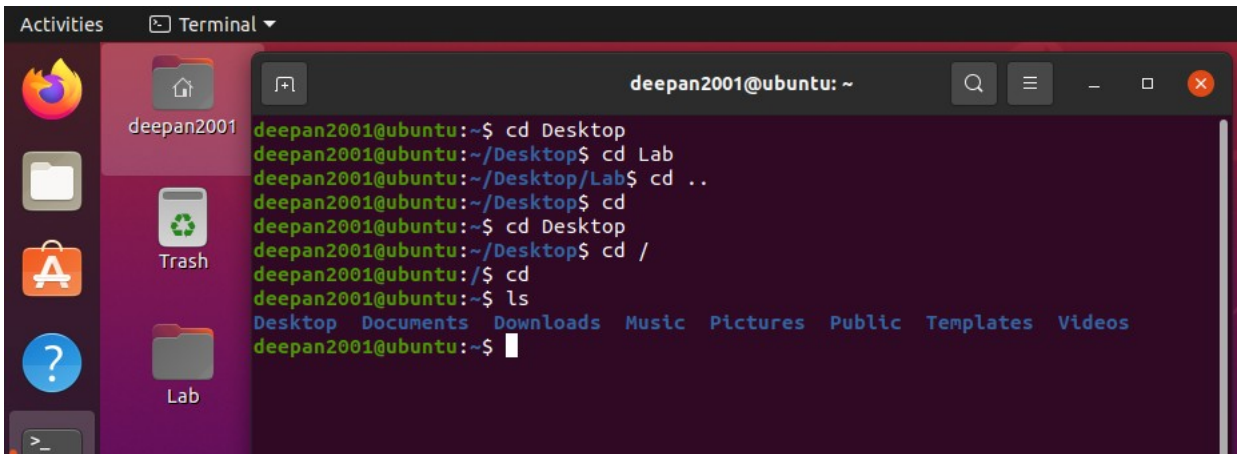
2) ls

Typing 'ls' will list the contents of a directory with just information about file names.

The syntax for the ls command is: ls [options] [names]

Options:

-a Displays all files.

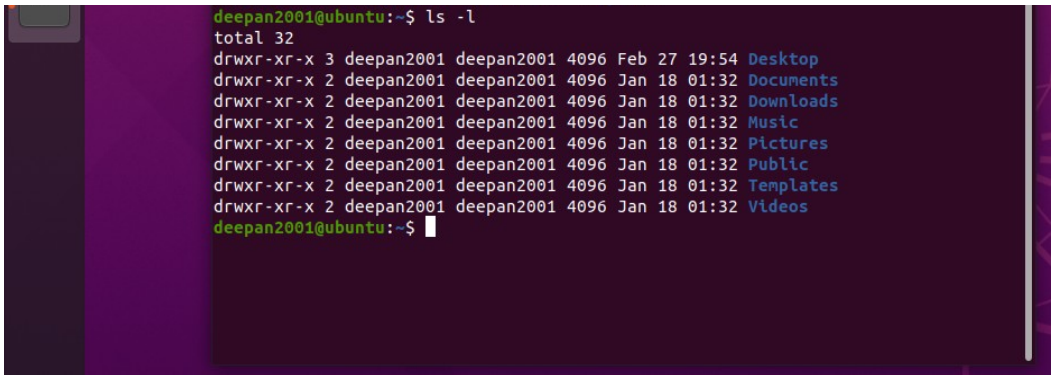


2.1) ls -a

A frequently used option with ls is -a to show all files. Showing all files means including the hidden files. When a file name on a Unix file system starts with a dot, it is considered a hidden file and it doesn't show up in regular file listings.

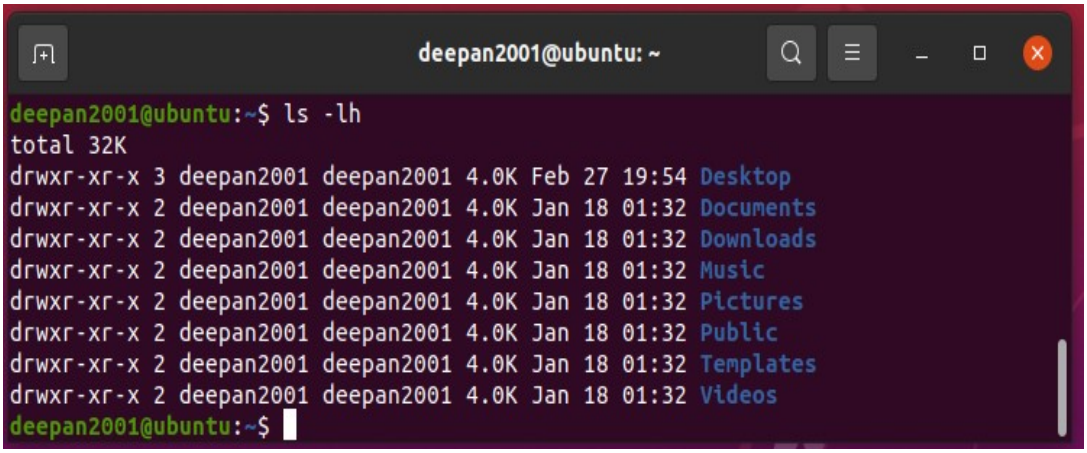
2.2) ls -l

Many times you will be using options with ls to display the contents of the directory in different formats or to display different parts of the directory. Typing just ls gives you a list of files in the directory. Typing ls -l (that is a letter L, not the number 1) gives you a long listing.



2.3) ls -lh

Another frequently used ls option is -h. It shows the numbers (file sizes) in a more human readable format.

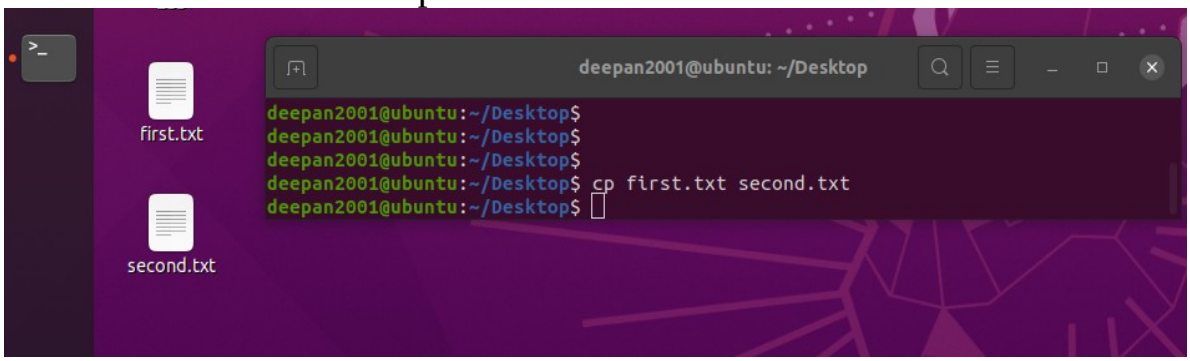


3) cp

'cp' is used for copying files from one place to another, or for making a duplicate of one file under a different name.

Example : cp first.txt second.txt

The first.txt file will be copied into second.txt



4) mv

'mv' is usedfor moving files from one place to another. It cuts the file from one place and pastes

it to another.

Options:

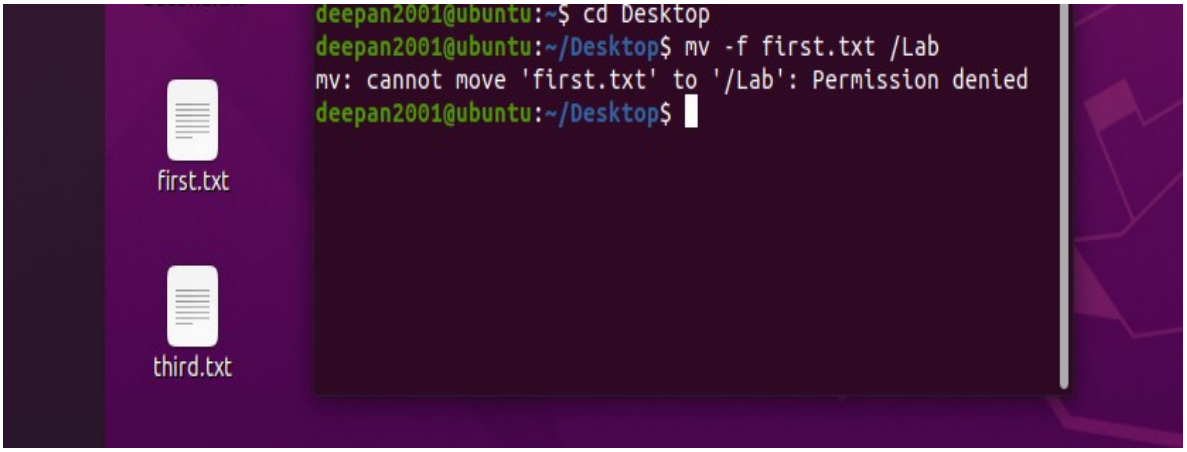
-f Forces the move.

-i Prompt for a confirmation before overwriting any files.

syntax :mv [options] sources target

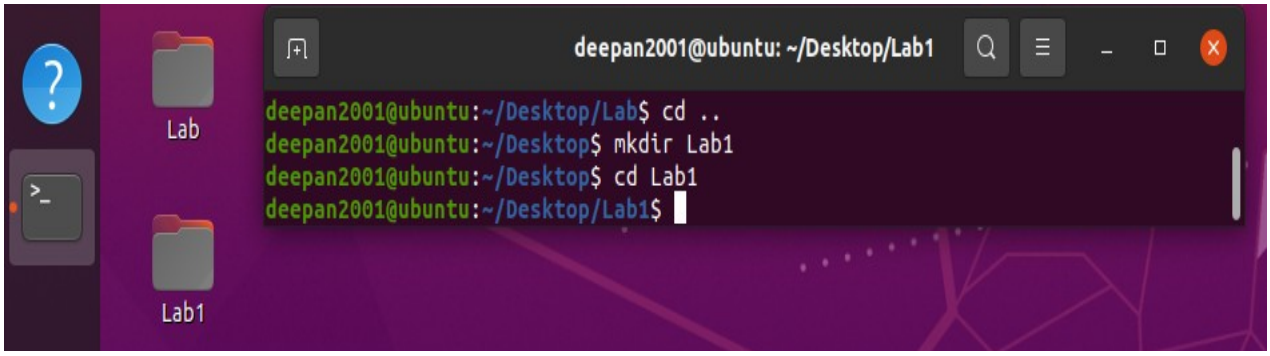
Examples: mv -f sitrc /usr

It will move the file sitrc.txt to the directory usr

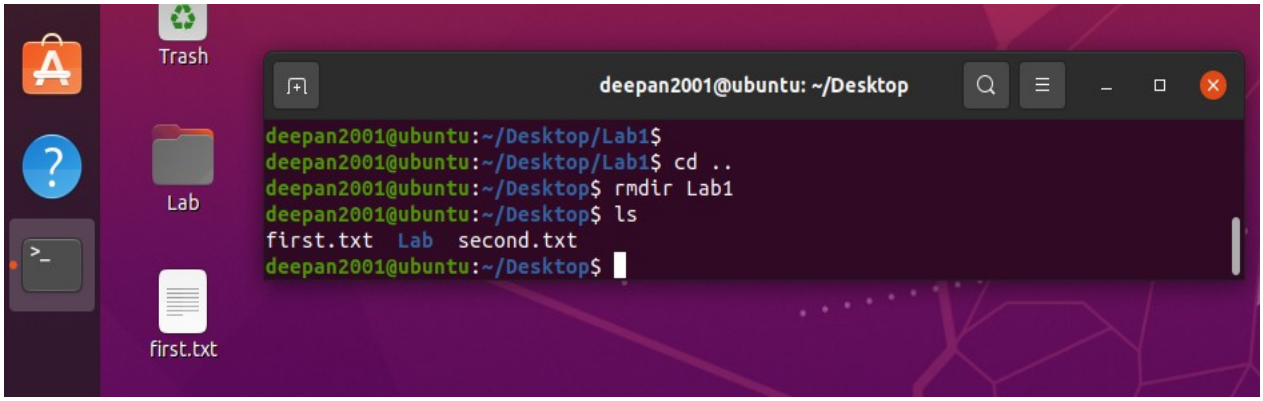


5) mkdir: To create your own directories with mkdir. You have to give at least one parameter to mkdir, the name of the new directory to be created.

$ mkdir MyDir

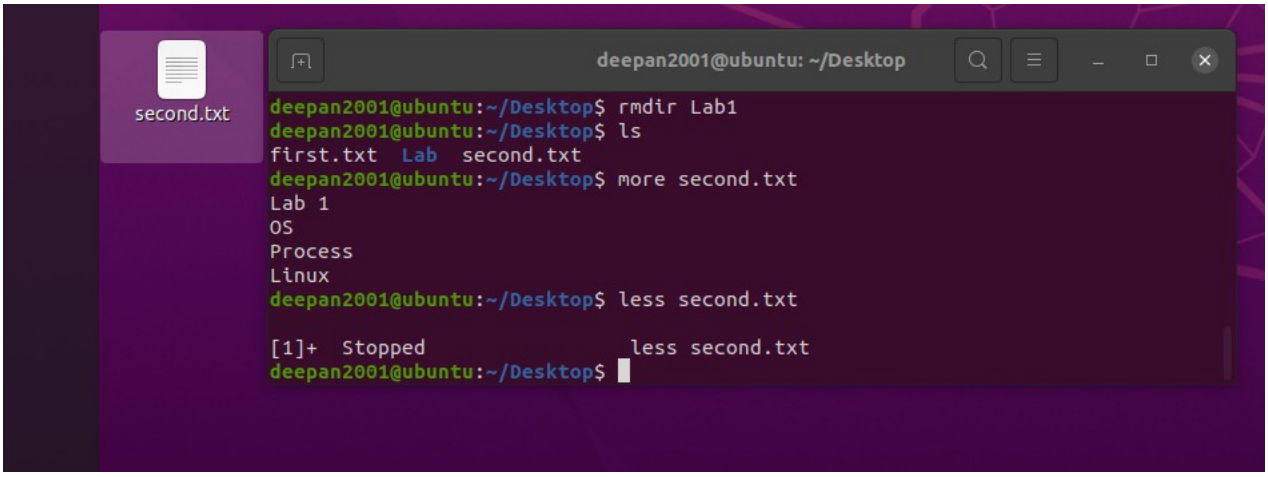


6) rmdir : When a directory is empty, you can use rmdir to remove the directory.



7) more and less :

'more' is a command that we can use to read, for example, what's written in a file. We would type 'more xyz' to see the file completely. Then, we can press the 'q' key to stop viewing the file. We can scroll back up to see the whole text if we want.

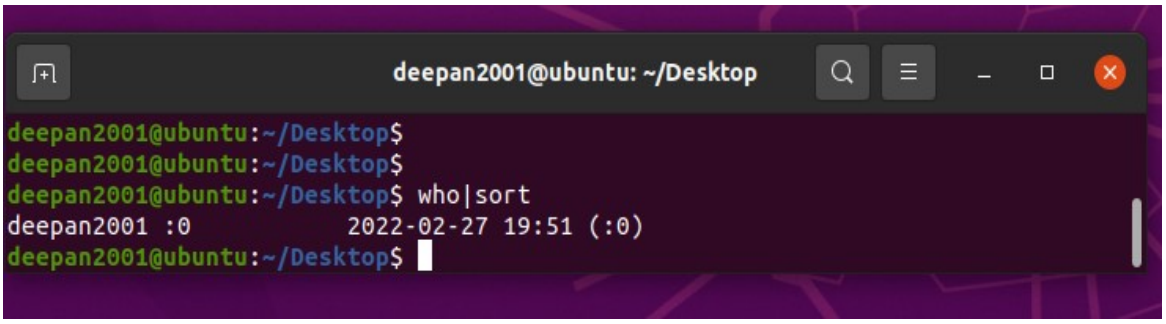


8) Plumbing with "pipes" in Linux

To use the pipe command, we don't type: pipe. We press the '|' key. This is used with other commands. That means that the pipe will separate two commands so that they will be done one after the other. Let's try some plumbing.

For example, list the numbers of users currently login in the system and then sort it.

ls who | sort



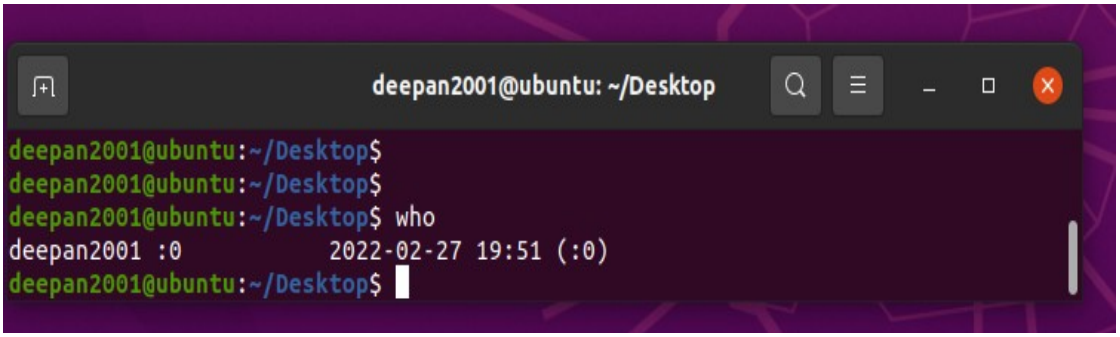
9) who

This is used to find out who's working on our system. As we now know, Linux is a multiuser system. Even if we're using one computer at our home, we may be working as more than one person. For example, if we logged in as 'root' but are working as 'nitin'. We may see something like this:

root tty1 May 20 09:48

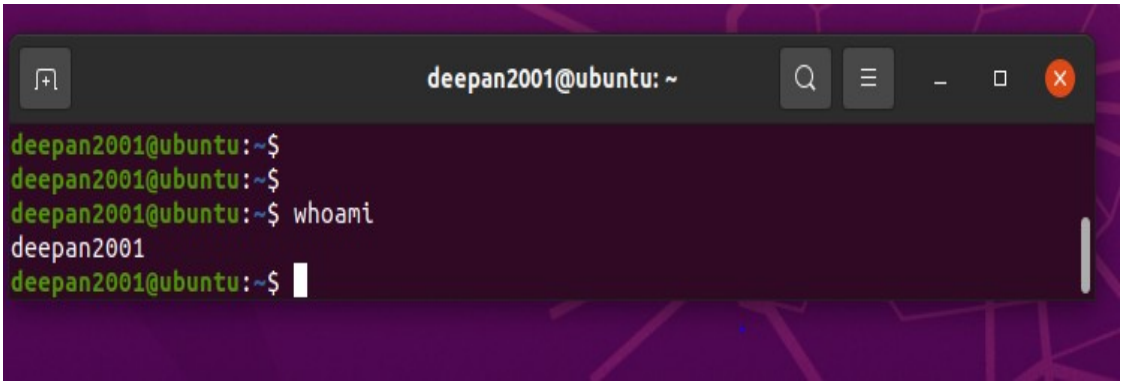
nitin tty2 May 20 10:05

This is just Linux's way of saying that 'root' started working on terminal 1 on May 20 at 9:48 in the morning and nitin started working on terminal 2 at 10:05. This is mainly used in networked situations so the system administrator knows who's working.



10) whoami :

It is a little program that tells us who we are, just in case we didn't know already. Actually it tells us who we are in terms of how Linux understands who you are, that is to say, our user name.

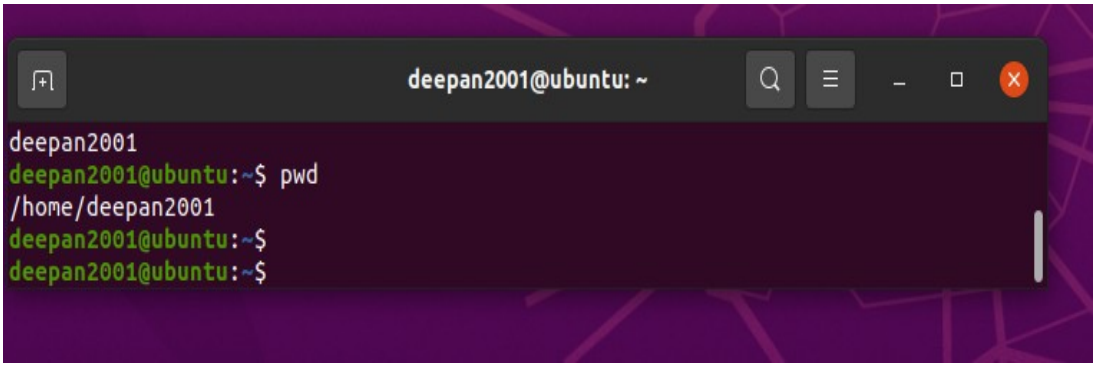


11) pwd (print working directory) :

The pwd command displays the full pathname of the current directory. The syntax for the pwd

command is:

$ pwd



12) cat :

The cat command reads one or more files and prints them to standard output.

The syntax for the cat command is:

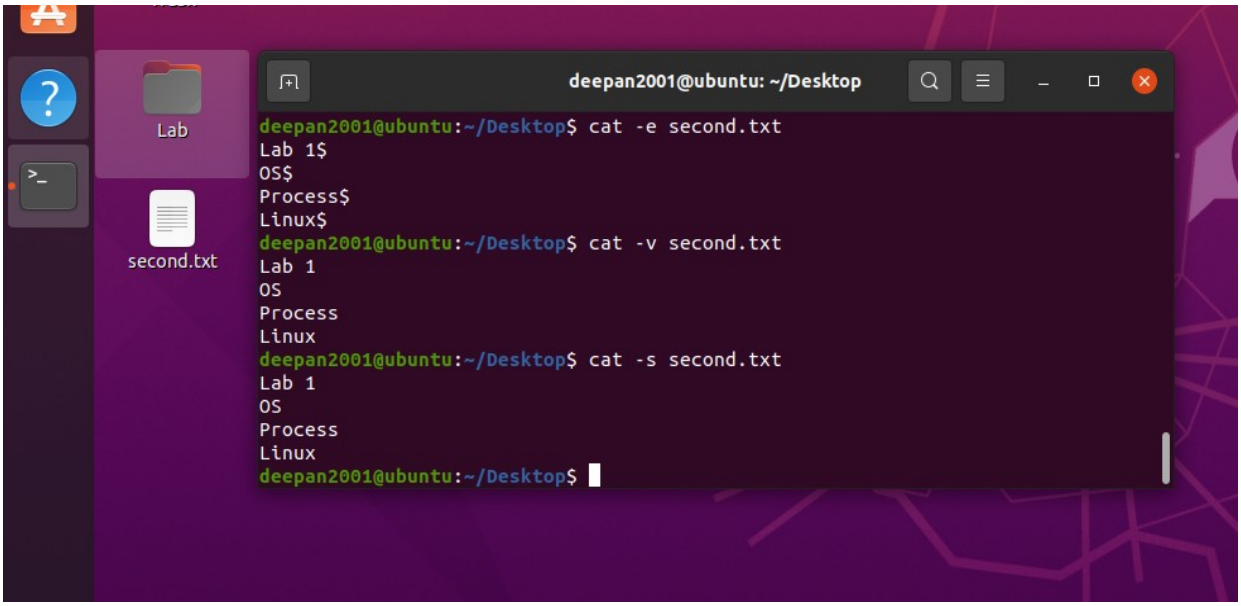
cat [options] [files]

options:

-e $ is printed at the end of each line. This option must be used with -v.

-s Suppress messages pertaining to files that do not exist.

Examples: cat file1



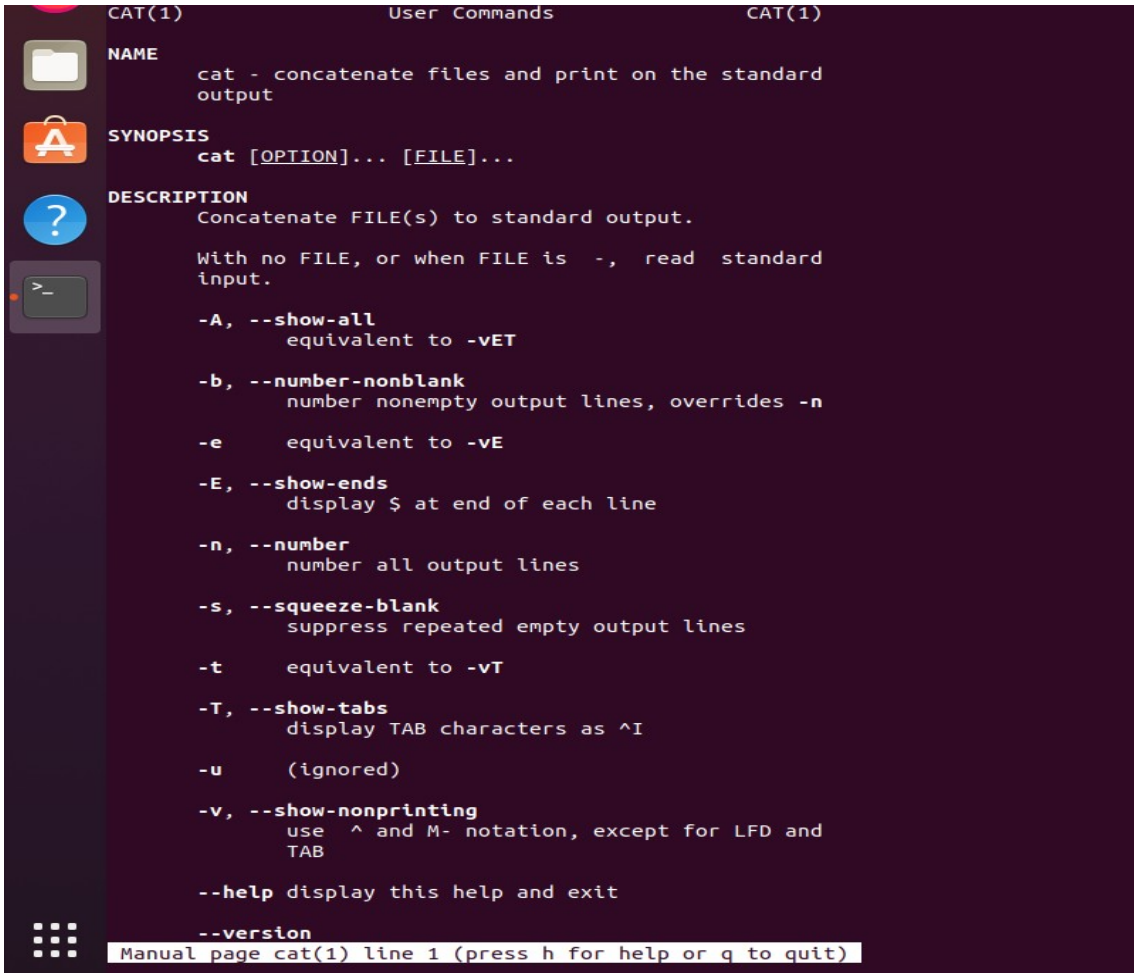
13) man

man is the system's manual viewer; it can be used to display manual pages,

scroll up and down,

search for occurrences of specific text, and other useful functions.

$ man cat



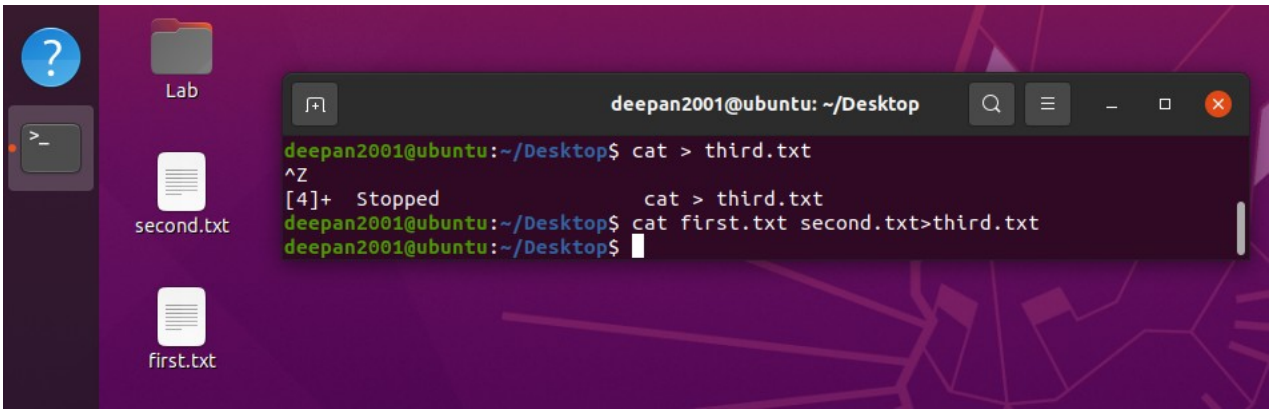
14) cat command :

cat (short for concatenate) is one of the most frequently used commands in Linux. It is used to list the contents of a file on the standard output (sdout). To run this command, type cat followed by the file's name and its extension. For instance: cat file.txt.

Here are other ways to use the cat command:

cat > filename creates a new file

cat filename1 filename2>filename3 joins two files (1 and 2) and stores the output of them in a new file (3)



15) touch command :

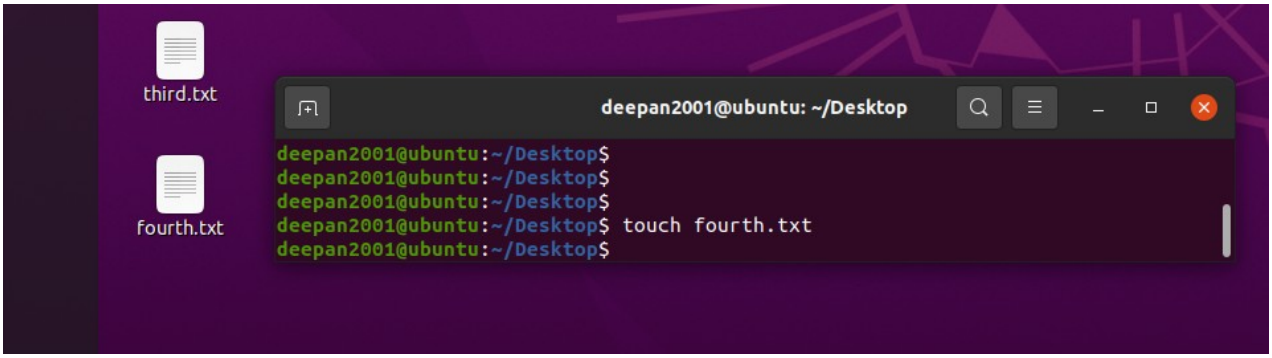
The touch command in Linux is used to create a new file without any content inside it.

Syntax: $touch [Option].. [Filename]..

It's very useful if you quickly want to create a new file inside your working directory directly from the terminal.

Example:

$ touch OS.txt



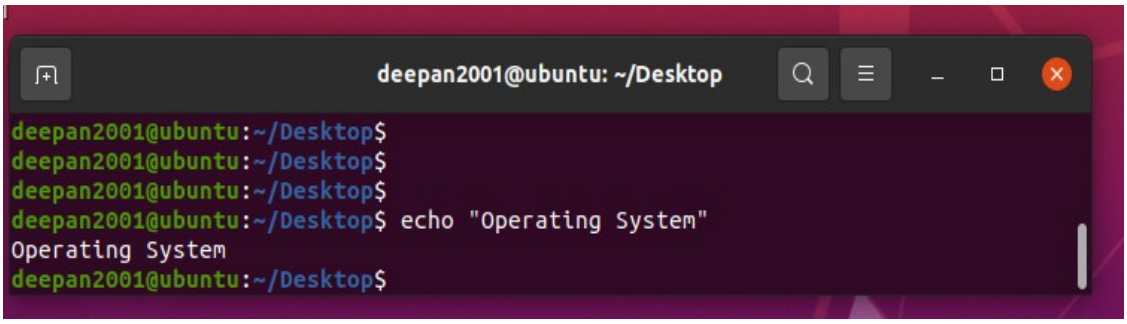
16) echo :

The echo command in Linux simply displays a line of text/string which is passed in as an argument. It is commonly used for debugging shell programs inside the terminal.

Syntax: $echo [Option] [String]

Example:

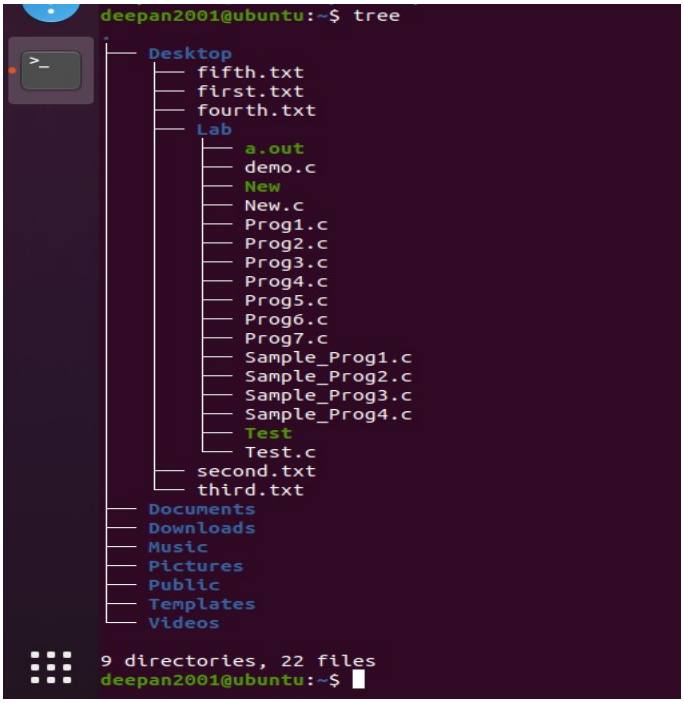
$ echo "Welcome To OSLAB"



17) tree :

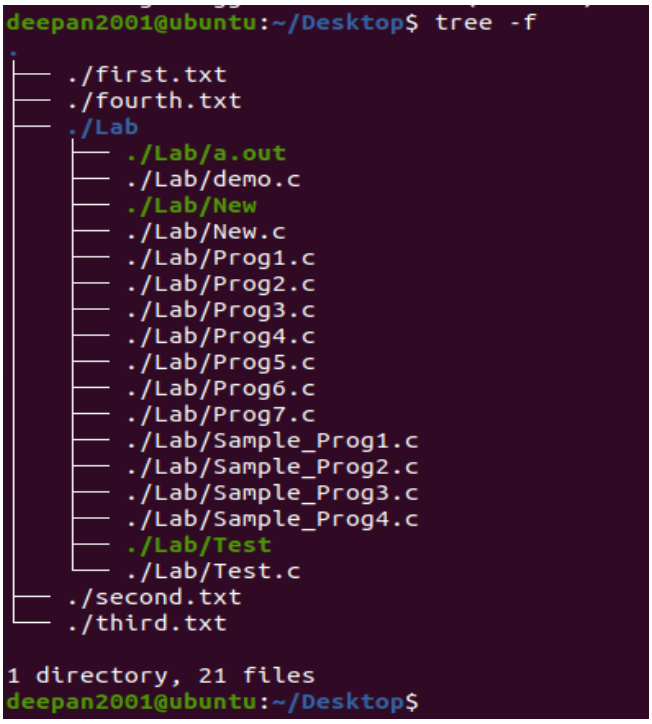
Used to display the contents of a directory as an indented tree.

$ tree



tree -f: Display the full path of each working directory and file inside your current directory.

$ tree -f

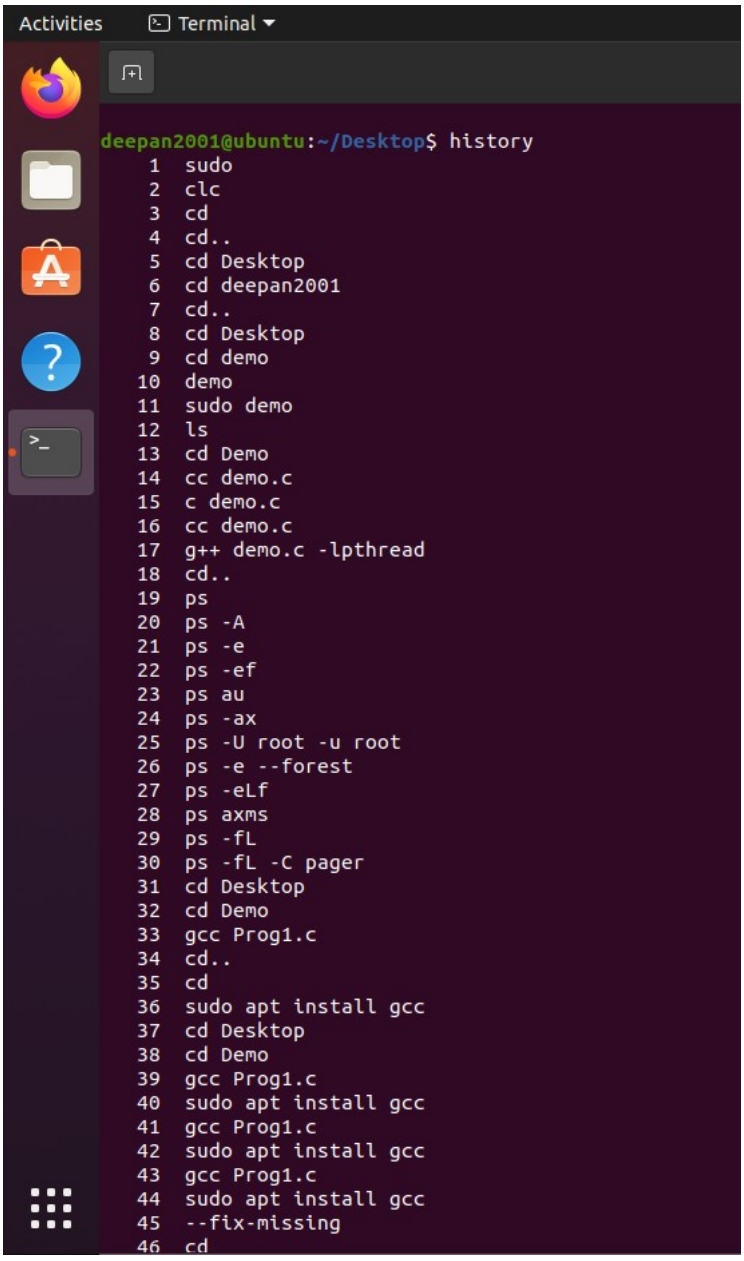


18) history:

The history command in Linux is used to view a history of all the commands previously

executed inside the bash terminal.

Syntax: $ history



Frequently used terminal Commands (Windows)

1) Lists Installed Drivers (driverquery):

To get a full list of installed drivers in your pc.

```
C:\Users\Deepan>driverquery

Module Name  Display Name           Driver Type   Link Date
============ ====================== ============ ====================
1394ohci     1394 OHCI Compliant Ho Kernel
3ware        3ware                  Kernel        18/05/2015 05:28:03 PM
ACPI         Microsoft ACPI Driver  Kernel
AcpiDev      ACPI Devices driver    Kernel
acpiex       Microsoft ACPIEx Drive Kernel
acpipagr     ACPI Processor Aggrega Kernel
AcpiPmi      ACPI Power Meter Drive Kernel
acpitime     ACPI Wake Alarm Driver Kernel
Acx01000     Acx01000               Kernel
ADP80XX      ADP80XX                Kernel        09/04/2015 03:49:48 PM
AFD          Ancillary Function Dri Kernel
afunix       afunix                 Kernel
ahcache      Application Compatibil Kernel
amdgpio2     AMD GPIO Client Driver Kernel        07/02/2019 04:32:20 AM
amdi2c       AMD I2C Controller Ser Kernel        13/06/2018 12:25:43 AM
AmdK8        AMD K8 Processor Drive Kernel
AmdPPM       AMD Processor Driver   Kernel
amdsata      amdsata                Kernel        14/05/2015 07:14:52 AM
amdsbs       amdsbs                 Kernel        11/12/2012 04:21:44 PM
amdxata      amdxata                Kernel        30/04/2015 07:55:35 PM
AppID        AppID Driver           Kernel
applockerflt Smartlocker Filter Dri Kernel
arcsas       Adaptec SAS/SATA-II RA Kernel        09/04/2015 02:12:07 PM
AsyncMac     RAS Asynchronous Media Kernel
atapi        IDE Channel            Kernel
b06bdrv      QLogic Network Adapter Kernel        25/05/2016 02:03:08 AM
bam          Background Activity Mo Kernel
BasicDisplay BasicDisplay           Kernel
BasicRender  BasicRender            Kernel
bcmfn2       bcmfn2 Service         Kernel        31/10/2016 09:09:15 PM
Beep         Beep                   Kernel
bindflt      Windows Bind Filter Dr File System
bowser       Browser                File System
BthA2dp      Microsoft Bluetooth A2 Kernel
```

```
vpci         Microsoft Hyper-V Virt Kernel
vsmraid      vsmraid                Kernel        22/04/2014 02:21:41 PM
vsock        vSockets Virtual Machi Kernel        25/06/2020 02:21:08 AM
VSTXRAID     VIA StorX Storage RAID Kernel        21/01/2013 02:00:28 PM
vwifibus     Virtual Wireless Bus D Kernel
vwififlt     Virtual WiFi Filter Dr Kernel
vwifimp      Virtual WiFi Miniport  Kernel
WacomPen     Wacom Serial Pen HID D Kernel
wanarp       Remote Access IP ARP D Kernel
wanarpv6     Remote Access IPv6 ARP Kernel
wcifs        Windows Container Isol File System
wcnfs        Windows Container Name File System
WdBoot       Windows Defender Antiv Kernel
WDC_SAM      WD SCSI Pass Thru driv Kernel        09/10/2015 03:31:13 PM
Wdf01000     Kernel Mode Driver Fra Kernel
WdFilter     Windows Defender Antiv File System
wdiwifi      WDI Driver Framework   Kernel
WdmCompanion WdmCompanionFilter     Kernel
WdNisDrv     Windows Defender Antiv Kernel
WFPLWFS      Microsoft Windows Filt Kernel
WIMMount     WIMMount               File System
WindowsTrust Windows Trusted Execut Kernel
WindowsTrust Microsoft Windows Trus Kernel
WinMad       WinMad Service         Kernel        25/04/2018 11:27:32 AM
WinNat       Windows NAT Driver     Kernel
WinQuic      WinQuic                Kernel
WINUSB       WinUsb Driver          Kernel
WinVerbs     WinVerbs Service       Kernel        25/04/2018 11:28:00 AM
WmiAcpi      Microsoft Windows Mana Kernel
Wof          Windows Overlay File S File System
WpdUpFltr    WPD Upper Class Filter Kernel
ws2ifsl      Windows Socket 2.0 Non Kernel
WudfPf       User Mode Driver Frame Kernel
WUDFRd       Windows Driver Foundat Kernel
WUDFWpdFs    WPD File System driver Kernel
WUDFWpdMtp   WUDFWpdMtp             Kernel
xboxgip      Xbox Game Input Protoc Kernel
xinputhid    XINPUT HID Filter Driv Kernel

C:\Users\Deepan>
```

2) Clear Screen (cls): To clear the existing commands in prompts type cls and press Enter.

```
C:\Users\Deepan>
```

3) List Hardware Information (systeminfo): Display basic information about your pc's hardware, like – motherboard, processor & ram.

```
C:\Users\Deepan>systeminfo

Host Name:                 DEEPAN
OS Name:                   Microsoft Windows 10 Home Single Language
OS Version:                10.0.18363 N/A Build 18363
OS Manufacturer:           Microsoft Corporation
OS Configuration:          Standalone Workstation
OS Build Type:             Multiprocessor Free
Registered Owner:          Deepan
Registered Organization:   N/A
Product ID:                00327-35154-35827-AAOEM
Original Install Date:     22/06/2020, 05:28:40 PM
System Boot Time:          28/02/2022, 08:35:08 AM
System Manufacturer:       Acer
System Model:              Swift SF314-55G
System Type:               x64-based PC
Processor(s):              1 Processor(s) Installed.
                           [01]: Intel64 Family 6 Model 142 Stepping 11 GenuineIntel ~1600 Mhz
BIOS Version:              American Megatrends Inc. V1.07, 24/12/2018
Windows Directory:         C:\Windows
System Directory:          C:\Windows\system32
Boot Device:               \Device\HarddiskVolume1
System Locale:             en-us;English (United States)
Input Locale:              00004009
Time Zone:                 (UTC-05:00) Indiana (East)
Total Physical Memory:     8,043 MB
Available Physical Memory: 1,950 MB
Virtual Memory: Max Size:  20,331 MB
Virtual Memory: Available: 10,124 MB
Virtual Memory: In Use:    10,207 MB
Page File Location(s):     C:\pagefile.sys
Domain:                    WORKGROUP
Logon Server:              \\DEEPAN
Hotfix(s):                 6 Hotfix(s) Installed.
                           [01]: KB4580980
                           [02]: KB4517245
                           [03]: KB4537759
                           [04]: KB4541302
                           [05]: KB4541338
                           [06]: KB4580325
```

```
Virtual Memory: Max Size:  20,331 MB
Virtual Memory: Available: 10,124 MB
Virtual Memory: In Use:    10,207 MB
Page File Location(s):     C:\pagefile.sys
Domain:                    WORKGROUP
Logon Server:              \\DEEPAN
Hotfix(s):                 6 Hotfix(s) Installed.
                           [01]: KB4580980
                           [02]: KB4517245
                           [03]: KB4537759
                           [04]: KB4541302
                           [05]: KB4541338
                           [06]: KB4580325
Network Card(s):           4 NIC(s) Installed.
                           [01]: Intel(R) Wireless-AC 9560
                                 Connection Name: Wi-Fi
                                 Status:          Media disconnected
                           [02]: VMware Virtual Ethernet Adapter for VMnet1
                                 Connection Name: VMware Network Adapter VMnet1
                                 DHCP Enabled:    No
                                 IP address(es)
                                 [01]: 192.168.116.1
                                 [02]: fe80::2dfb:b0c4:edc0:85ab
                           [03]: VMware Virtual Ethernet Adapter for VMnet8
                                 Connection Name: VMware Network Adapter VMnet8
                                 DHCP Enabled:    No
                                 IP address(es)
                                 [01]: 192.168.142.1
                                 [02]: fe80::347e:495:af11:a4b3
                           [04]: VirtualBox Host-Only Ethernet Adapter
                                 Connection Name: VirtualBox Host-Only Network
                                 DHCP Enabled:    No
                                 IP address(es)
                                 [01]: 192.168.56.1
                                 [02]: fe80::501a:f9ee:62f6:3796
Hyper-V Requirements:      VM Monitor Mode Extensions: Yes
                           Virtualization Enabled In Firmware: Yes
                           Second Level Address Translation: Yes
                           Data Execution Prevention Available: Yes

C:\Users\Deepan>
```

4)List Currently Running Task (tasklist): To get current list of all tasks running on your pc.

```
C:\Users\Deepan>tasklist

Image Name                     PID Session Name        Session#    Mem Usage
========================= ======== ================ =========== ============
System Idle Process              0 Services                   0          8 K
System                           4 Services                   0         20 K
Registry                       120 Services                   0     43,808 K
smss.exe                       476 Services                   0        220 K
csrss.exe                      640 Services                   0      3,572 K
wininit.exe                    804 Services                   0      3,964 K
csrss.exe                      816 Console                    1      4,564 K
services.exe                   876 Services                   0      7,268 K
lsass.exe                      896 Services                   0     12,880 K
svchost.exe                   1016 Services                   0      2,552 K
svchost.exe                     84 Services                   0     25,568 K
fontdrvhost.exe                424 Services                   0      1,432 K
svchost.exe                    912 Services                   0     12,596 K
svchost.exe                   1040 Services                   0      6,532 K
winlogon.exe                  1112 Console                    1      8,388 K
WUDFHost.exe                  1164 Services                   0      9,532 K
fontdrvhost.exe               1188 Console                    1     10,040 K
dwm.exe                       1292 Console                    1     63,628 K
svchost.exe                   1328 Services                   0      4,952 K
svchost.exe                   1340 Services                   0      8,448 K
svchost.exe                   1356 Services                   0      5,340 K
svchost.exe                   1364 Services                   0      4,996 K
svchost.exe                   1480 Services                   0      7,008 K
svchost.exe                   1532 Services                   0     11,408 K
svchost.exe                   1568 Services                   0      8,988 K
svchost.exe                   1580 Services                   0      8,472 K
svchost.exe                   1704 Services                   0     12,300 K
svchost.exe                   1756 Services                   0      6,188 K
WUDFHost.exe                  1788 Services                   0      3,524 K
svchost.exe                   1824 Services                   0      4,176 K
svchost.exe                   1848 Services                   0      9,640 K
svchost.exe                   1856 Services                   0      6,428 K
svchost.exe                   1980 Services                   0      4,144 K
svchost.exe                   1804 Services                   0      7,712 K
svchost.exe                   2156 Services                   0      6,844 K
svchost.exe                   2184 Services                   0      5,824 K
```

5) Change the Directory / Folder (cd): Use cd\ to go to the top of the directory tree. If you need to go to a specific folder from this drive run the command cd Foldername. Use the cd.. Command to go one folder up

```
C:\Users\Deepan>cd
C:\Users\Deepan

C:\Users\Deepan>
```

6)Change the Drive: If you wanted to change the drive from "C:" to "D:", type d: and then press Enter.

```
C:\Users\Deepan>cd..

C:\Users>d:

D:\>
```

7)Create a New Directory / Folder (mkdir):

You can make a new folder using the mkdir command.

```
C:\Users>d:

D:\>mkdir Deepan

D:\>cd Deepan

D:\Deepan>
```

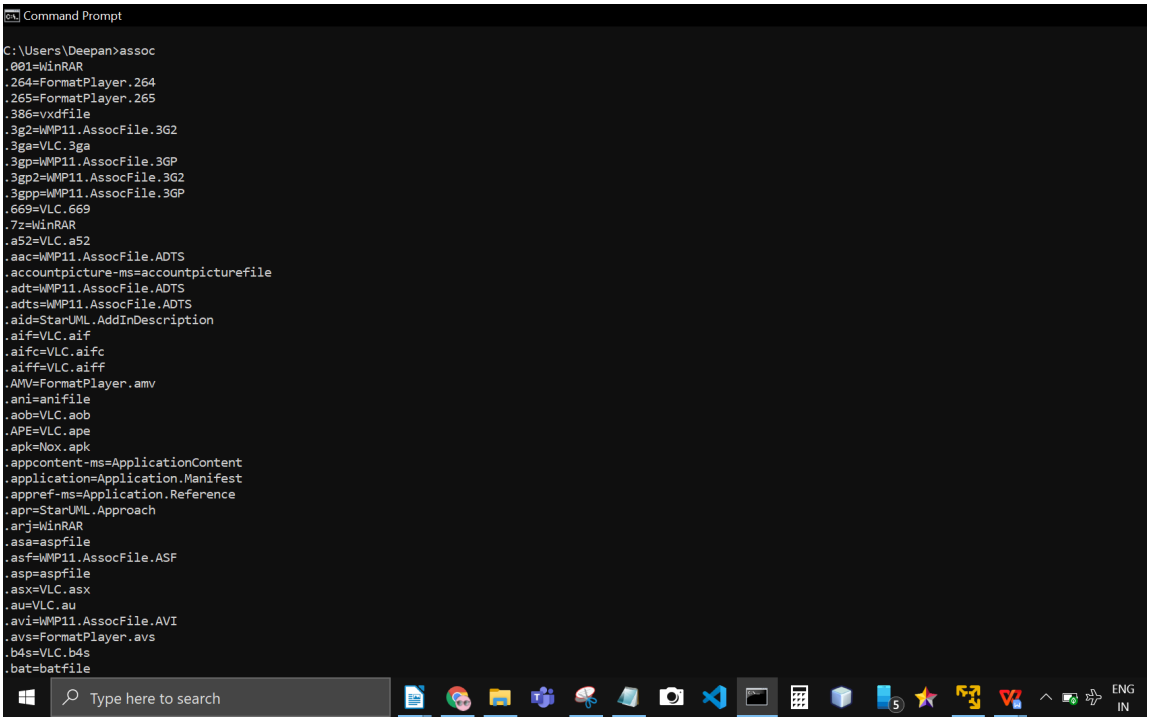
8)Lists directory (dir):

To display all directories in the drive.

```
D:\Deepan>dir
 Volume in drive D is Deepan
 Volume Serial Number is 0C7E-C511

 Directory of D:\Deepan

28/02/2022  08:53 PM    <DIR>          .
28/02/2022  08:53 PM    <DIR>          ..
               0 File(s)              0 bytes
               2 Dir(s)  42,950,701,056 bytes free

D:\Deepan>
```

9) Assoc :

To display a full list of filename extensions and program associations. Most files in Windows are associated with a specific program that is assigned to open the file by default.



SYSTEM MONITORING ON A LINUX PLATFORM :

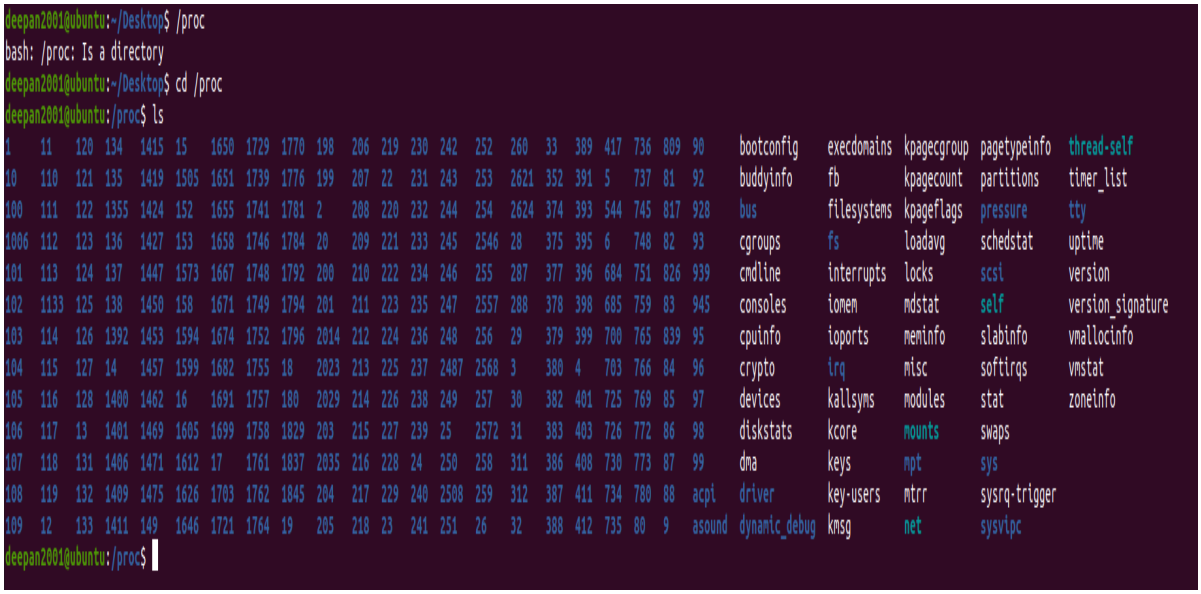
What is a /proc File System?

The behaviour of operating system (kernel) using / proc is utility.

The /proc file system isn't a file system in the standard sense. Rather, the proc file system is a pseudo-file system which is used as an interface to kernel data structures. It is commonly mounted at /proc. Most of it is read-only, but some files allow kernel variables to be changed. The /proc file system is an OS mechanism whose interface appears as a directory in the conventional UNIX file system (in the root directory). You can change to /proc just as you change to any other directory. For example,

$ cd /proc

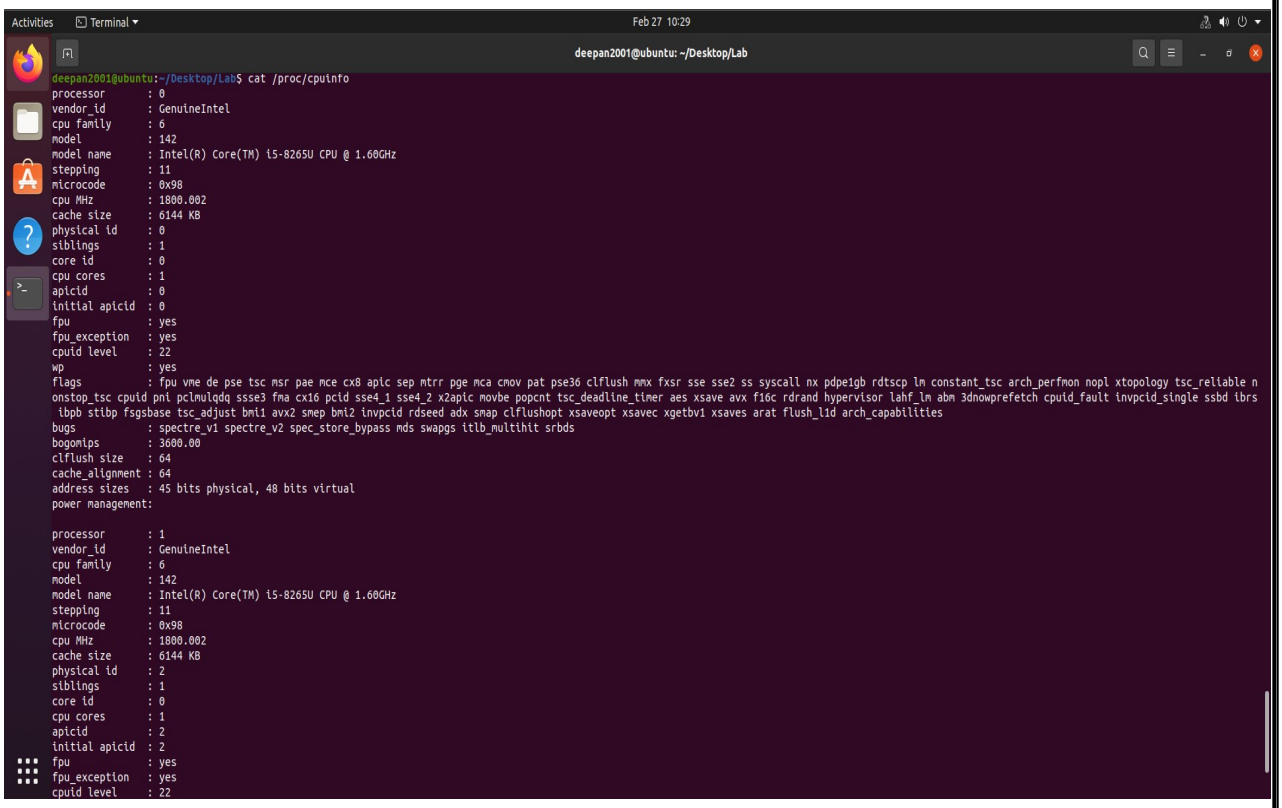
makes /proc the current directory. Once you have made /proc the current directory, you can list its contents by using the ls command.

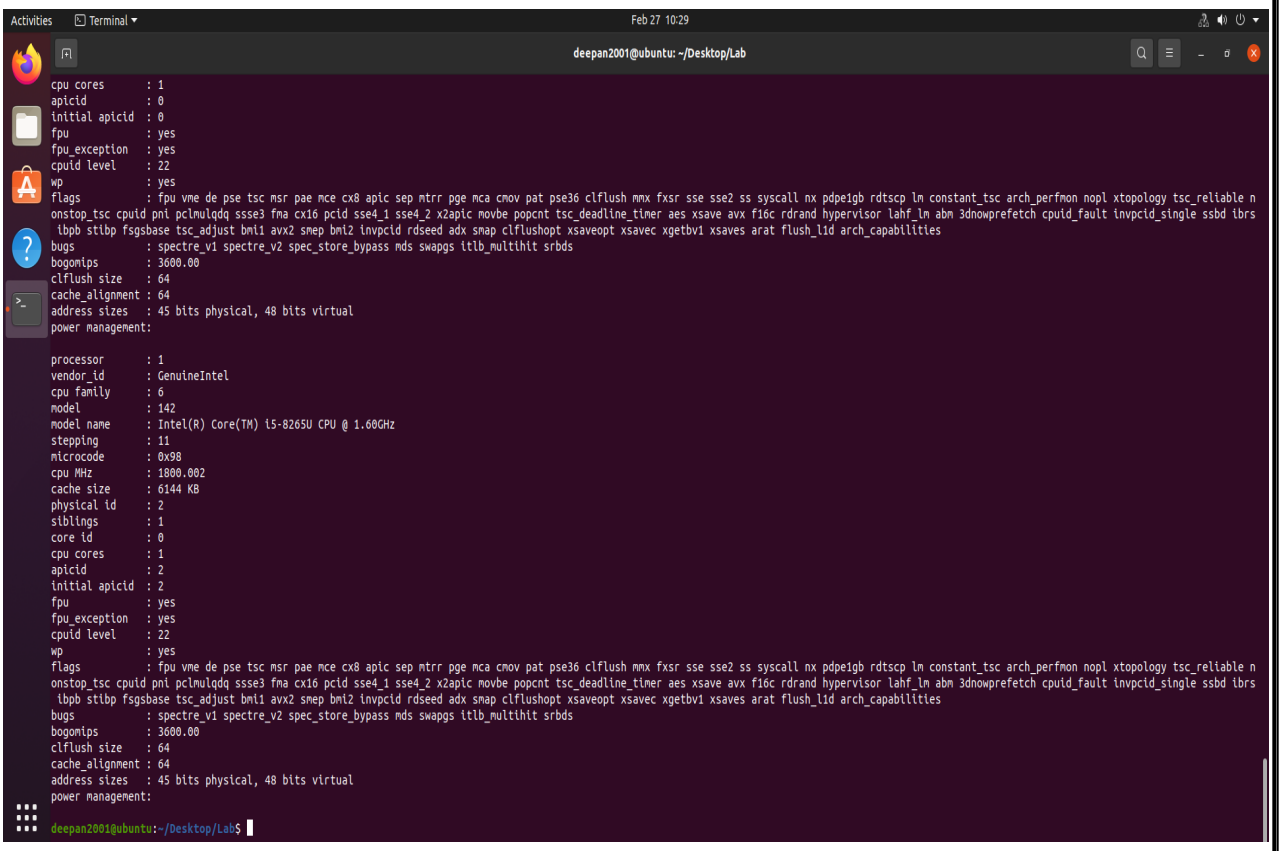


Contents of /proc File System:

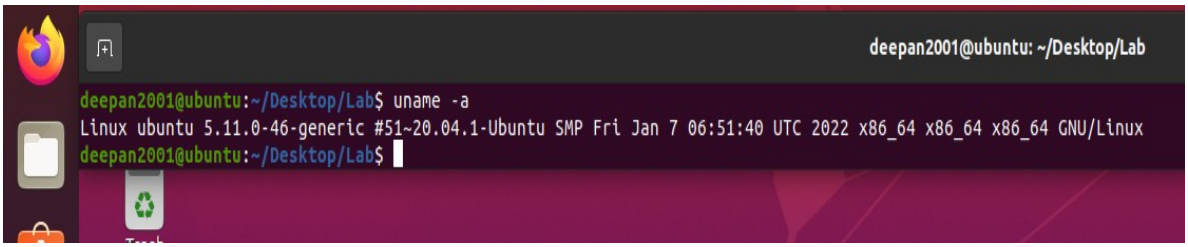
The proc file system can be used to obtain information about the system and to change certain kernel parameters at runtime.

1. What's the CPU type and model? (cat /proc/cpuinfo) lscpu

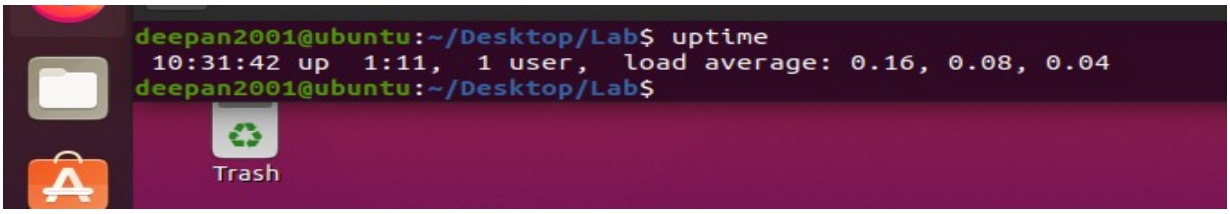




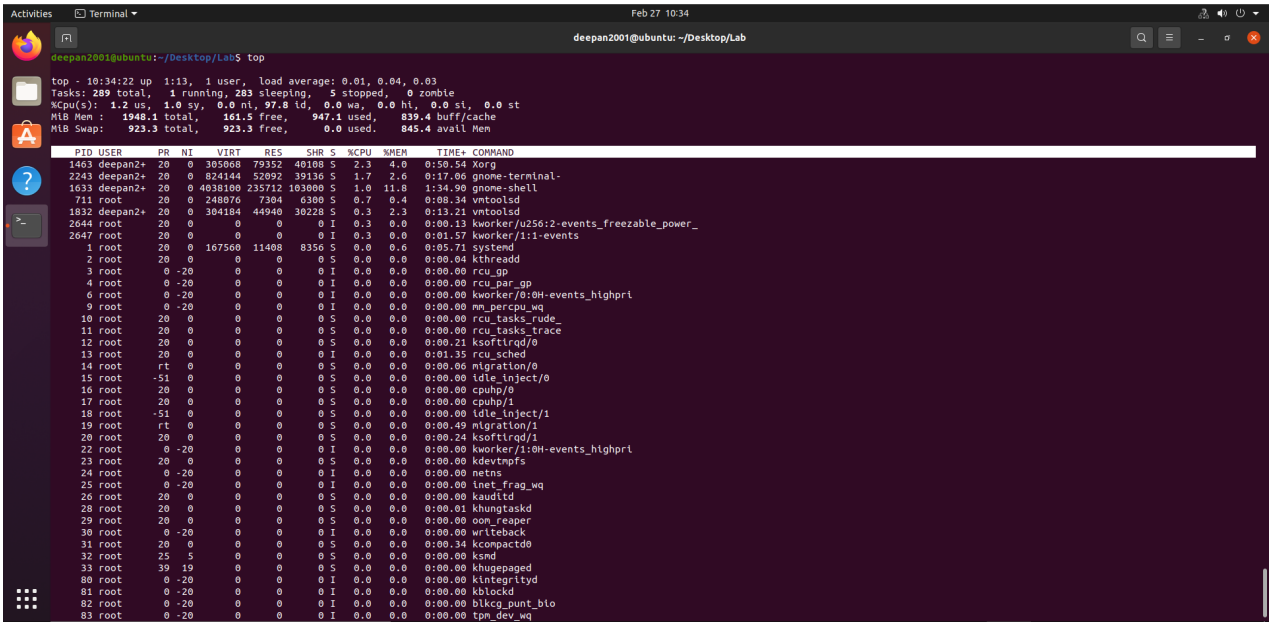
2. What version of the Linux kernel are you using? (uname -a)



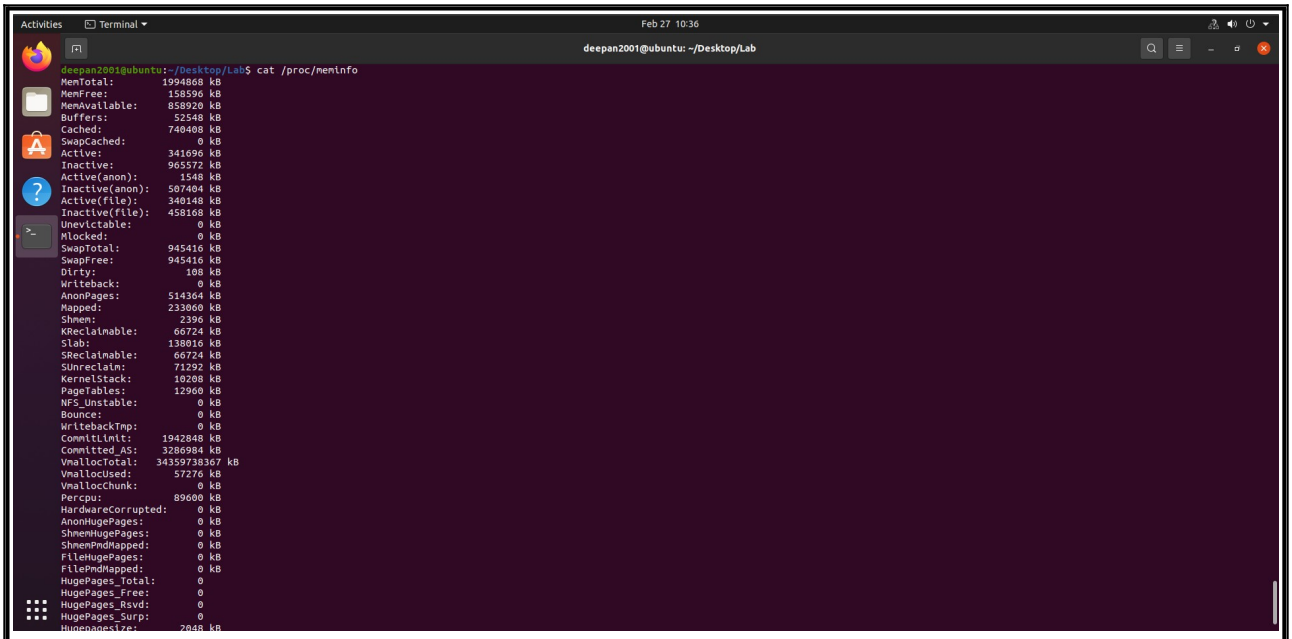
3. How long has it been since your PC last booted? (uptime)



4. How much of the total CPU time has been spent executing in user mode? idle? (top)



5. How much memory is configured in your PC? (cat/proc/ meminfo)



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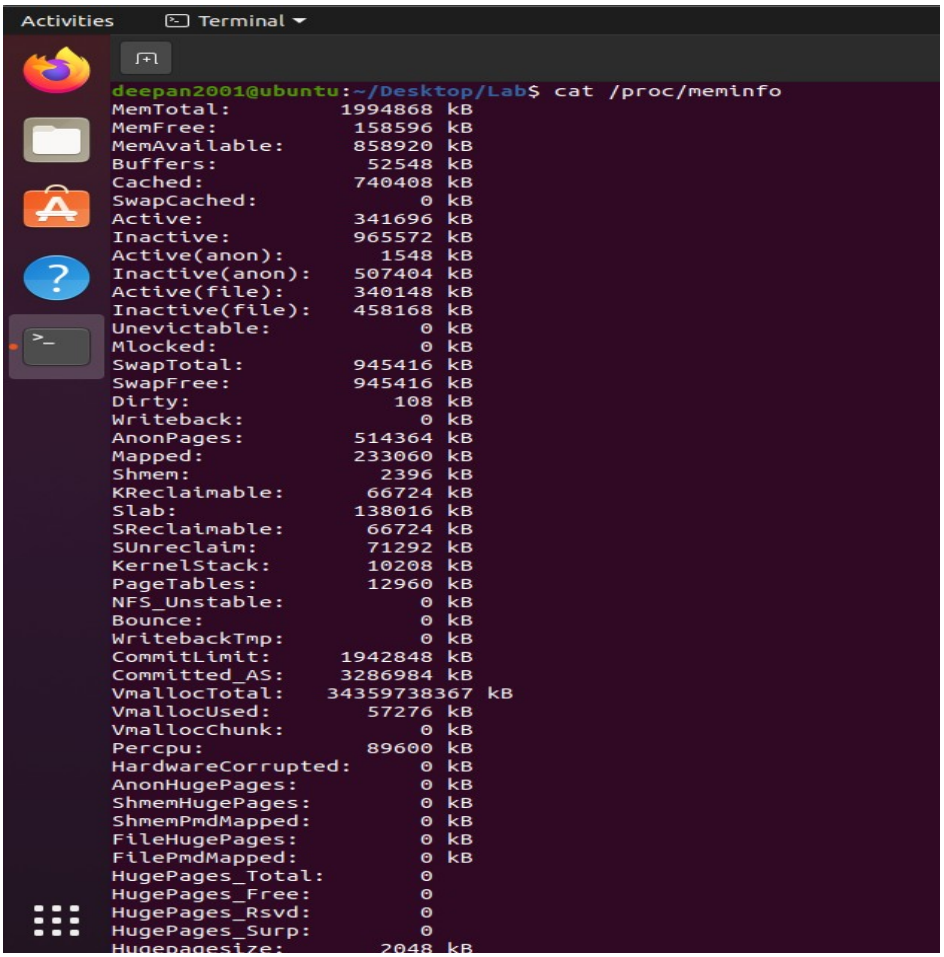
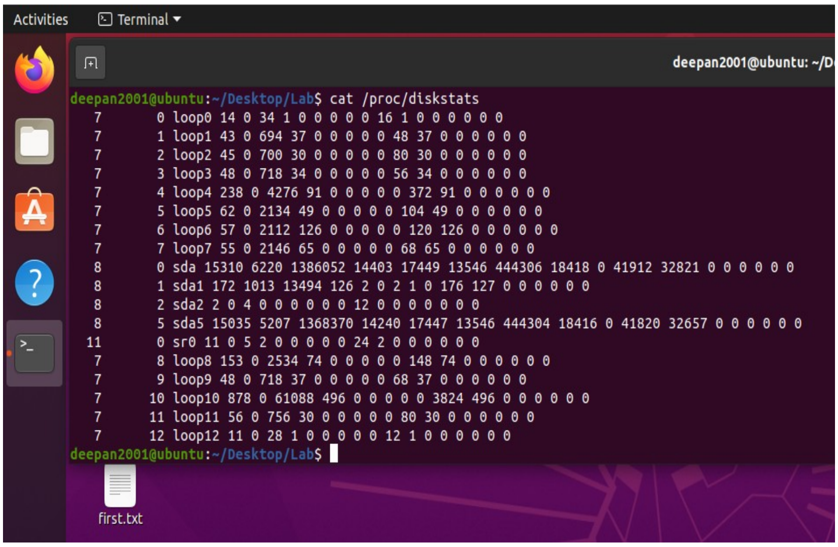
Total Memory : 1994868KB

6. How much memory is currently available? (cat/proc/meminfo)

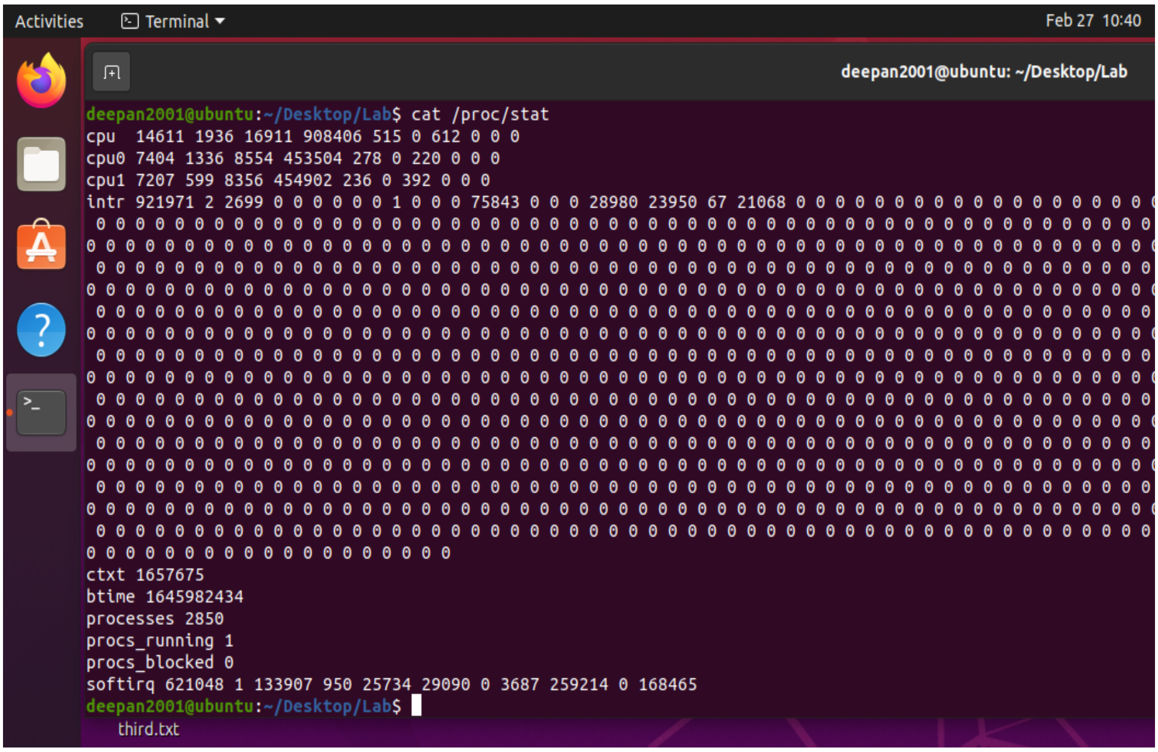


Currently available memory : 858920KB

7. How many disk read/write requests have been made? (cat /proc/diskstats)

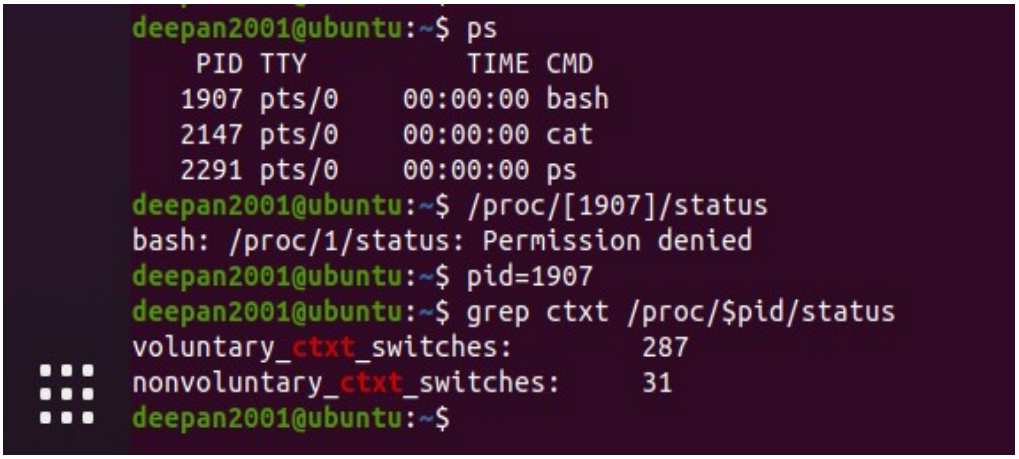


8. How many context switches has the kernel performed? (cat /proc/stat)

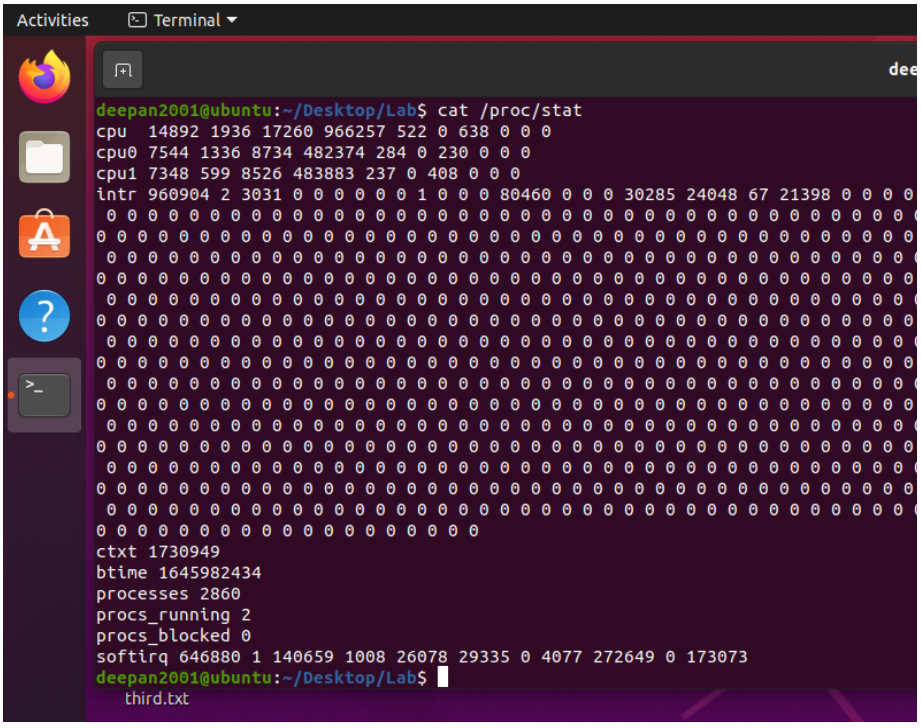


9. How many context switches has a process had? (/proc/ [pid] /status)

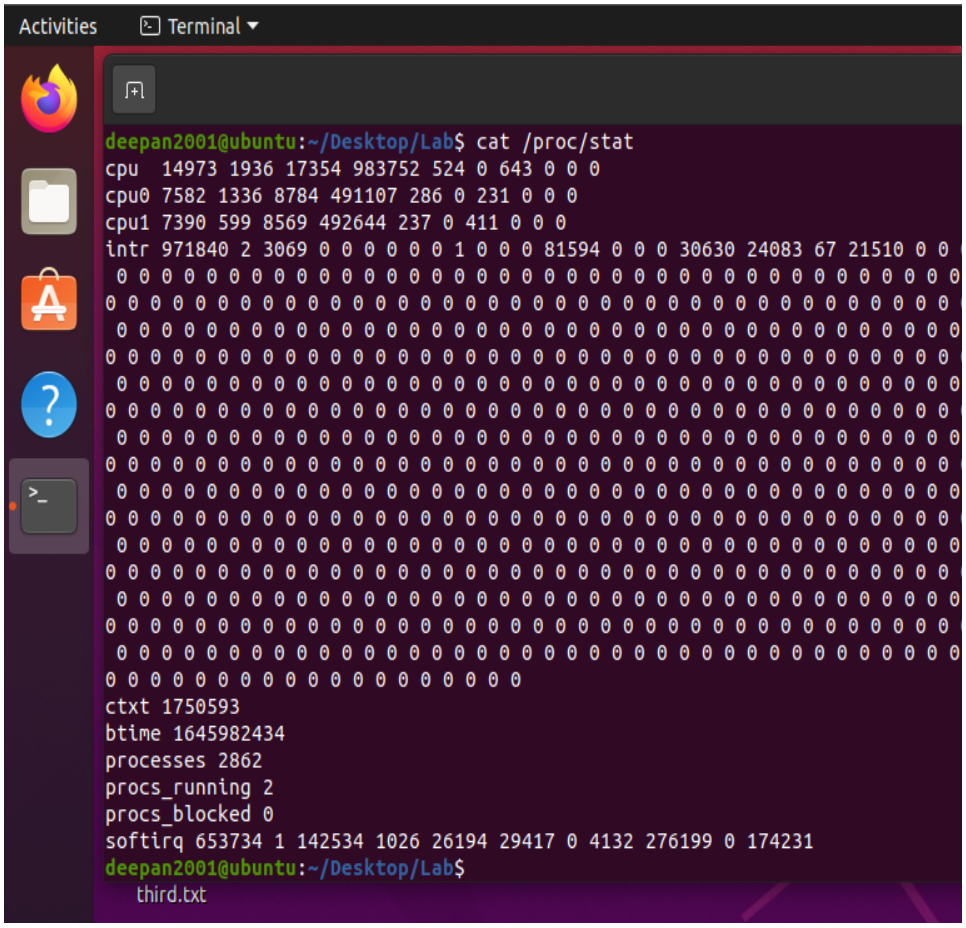
Note: Get Process id (pid) using PS command :



10. How many processes have been created since the system was booted? (cat /proc/ stat)



11. How many processes are blocked waiting for I/O to complete? (cat /proc/ stat)


Activities
Terminal
deepan2001@ubuntu:~/Desktop/Lab$ cat /proc/stat
cpu 14973 1936 17354 983752 524 0 643 0 0 0
cpu0 7582 1336 8784 491107 286 0 231 0 0 0
cpu1 7390 599 8569 492644 237 0 411 0 0 0
intr 971840 2 3069 0 0 0 0 0 1 0 0 0 81594 0 0 0 30630 24083 67 21510 0 0
ctxt 1750593
btime 1645982434
processes 2862
procs_running 2
procs_blocked 0
softirq 653734 1 142534 1026 26194 29417 0 4132 276199 0 174231
deepan2001@ubuntu:~/Desktop/Lab$
third.txt