

# OPERATING SYSTEMS

## LAB DIGITAL ASSIGNMENT - 1

Course Code : SWE3001

Slot : L25+L26

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

```
deepan2001@ubuntu:~$ cat /etc/shells
# /etc/shells: valid login shells
/bin/sh
/bin/bash
/usr/bin/bash
/bin/rbash
/usr/bin/rbash
/bin/dash
/usr/bin/dash
deepan2001@ubuntu:~$
```

To find the shell type following command :



```
deepan2001@ubuntu:~$ echo $SHELL
/bin/bash
deepan2001@ubuntu:~$
```

## Study of Linux & Windows Shell Commands :

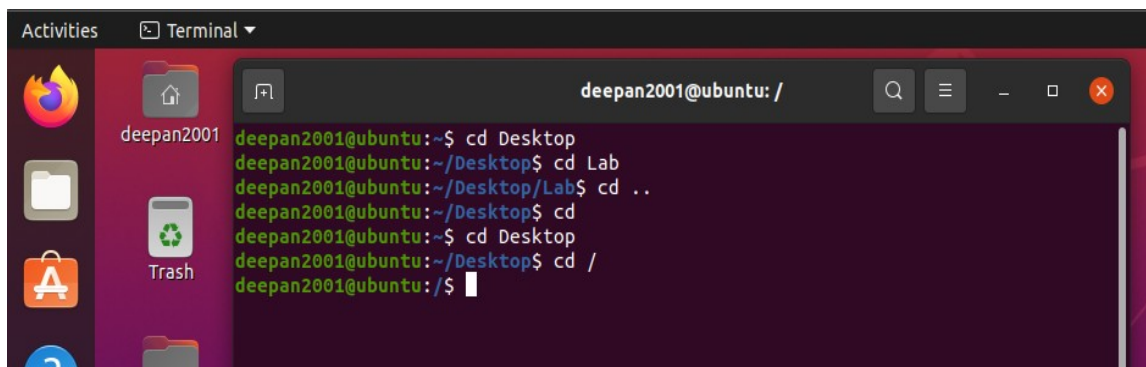
### 1) cd :

'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.

A screenshot of a Linux terminal window titled 'Terminal'. The user 'deepan2001' is logged in on an 'ubuntu' machine. The terminal shows a sequence of commands and their outputs: 'cd Desktop' (output: ~/Desktop), 'cd Lab' (output: ~/Desktop/Lab), 'cd ..' (output: ~/Desktop), 'cd' (output: ~/Desktop), 'cd Desktop' (output: ~/Desktop), 'cd /' (output: /), and finally '\$' (output: /\$). The terminal window has a dark background and standard window controls.

```
deepan2001@ubuntu: /
deepan2001@ubuntu:~$ cd Desktop
deepan2001@ubuntu:~/Desktop$ cd Lab
deepan2001@ubuntu:~/Desktop/Lab$ cd ..
deepan2001@ubuntu:~/Desktop$ cd
deepan2001@ubuntu:~$ cd Desktop
deepan2001@ubuntu:~/Desktop$ cd /
deepan2001@ubuntu:/$
```

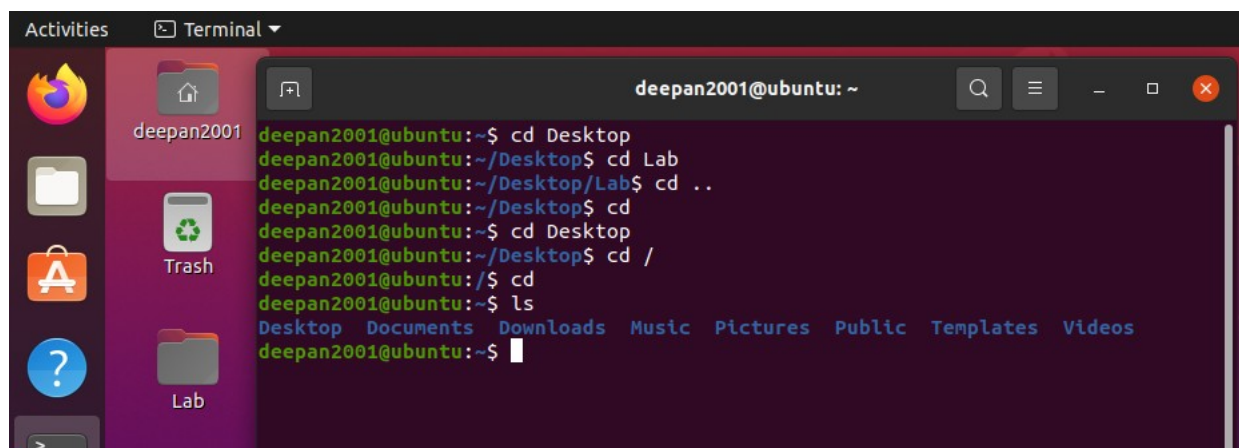
### 2) ls

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.

A screenshot of a Linux terminal window titled 'Terminal'. The user 'deepan2001' is logged in on an 'ubuntu' machine. The terminal shows a sequence of commands and their outputs: 'cd Desktop' (output: ~/Desktop), 'cd Lab' (output: ~/Desktop/Lab), 'cd ..' (output: ~/Desktop), 'cd' (output: ~/Desktop), 'cd Desktop' (output: ~/Desktop), 'cd /' (output: /), 'cd' (output: /\$), and finally 'ls' (output: Desktop Documents Downloads Music Pictures Public Templates Videos). The terminal window has a dark background and standard window controls.

```
deepan2001@ubuntu: ~
deepan2001@ubuntu:~$ cd Desktop
deepan2001@ubuntu:~/Desktop$ cd Lab
deepan2001@ubuntu:~/Desktop/Lab$ cd ..
deepan2001@ubuntu:~/Desktop$ cd
deepan2001@ubuntu:~$ cd Desktop
deepan2001@ubuntu:~/Desktop$ cd /
deepan2001@ubuntu:/$ cd
deepan2001@ubuntu:~$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
deepan2001@ubuntu:~$
```

## 2.1) ls -a

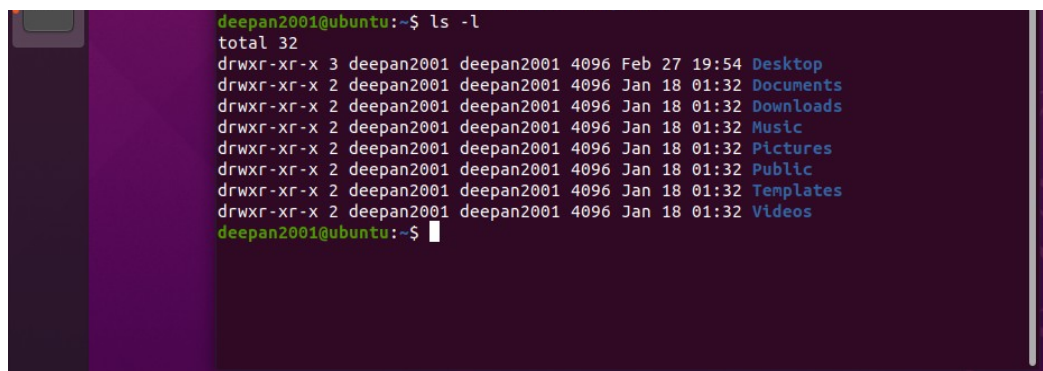
A frequently used option with ls is -a to show all files. Showing all files means including the hidden files. When a file name on a Unix file system starts with a dot, it is considered a hidden file and it doesn't show up in regular file listings.



```
deepan2001@ubuntu:~$ ls -A
.bash_history  .config      .gnupg      .profile      Videos
.bash_logout  Desktop      .local      Public
.bashrc        Documents    Music        .sudo_as_admin_successful
.cache         Downloads    Pictures     Templates
deepan2001@ubuntu:~$
```

## 2.2) ls -l

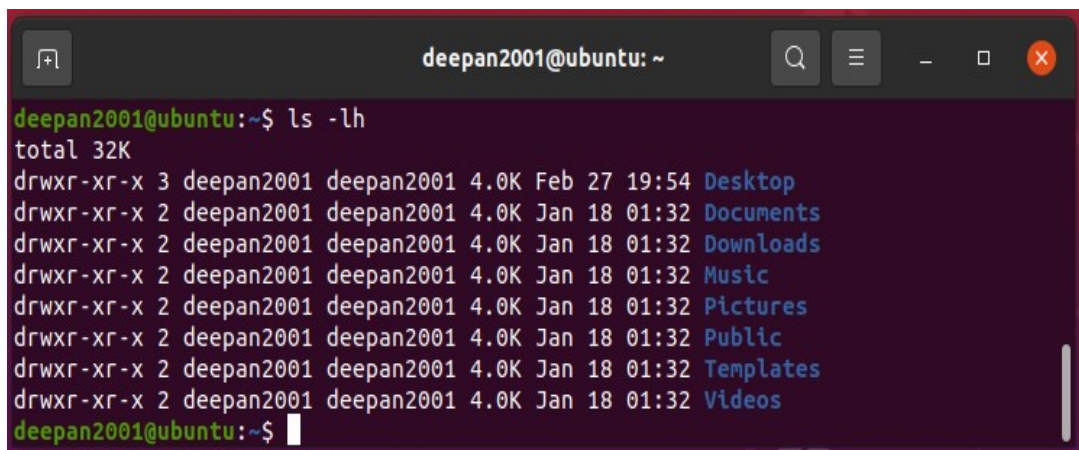
Many times you will be using options with ls to display the contents of the directory in different formats or to display different parts of the directory. Typing just ls gives you a list of files in the directory. Typing ls -l (that is a letter L, not the number 1) gives you a long listing.



```
deepan2001@ubuntu:~$ ls -l
total 32
drwxr-xr-x 3 deepan2001 deepan2001 4096 Feb 27 19:54 Desktop
drwxr-xr-x 2 deepan2001 deepan2001 4096 Jan 18 01:32 Documents
drwxr-xr-x 2 deepan2001 deepan2001 4096 Jan 18 01:32 Downloads
drwxr-xr-x 2 deepan2001 deepan2001 4096 Jan 18 01:32 Music
drwxr-xr-x 2 deepan2001 deepan2001 4096 Jan 18 01:32 Pictures
drwxr-xr-x 2 deepan2001 deepan2001 4096 Jan 18 01:32 Public
drwxr-xr-x 2 deepan2001 deepan2001 4096 Jan 18 01:32 Templates
drwxr-xr-x 2 deepan2001 deepan2001 4096 Jan 18 01:32 Videos
deepan2001@ubuntu:~$
```

## 2.3) ls -lh

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



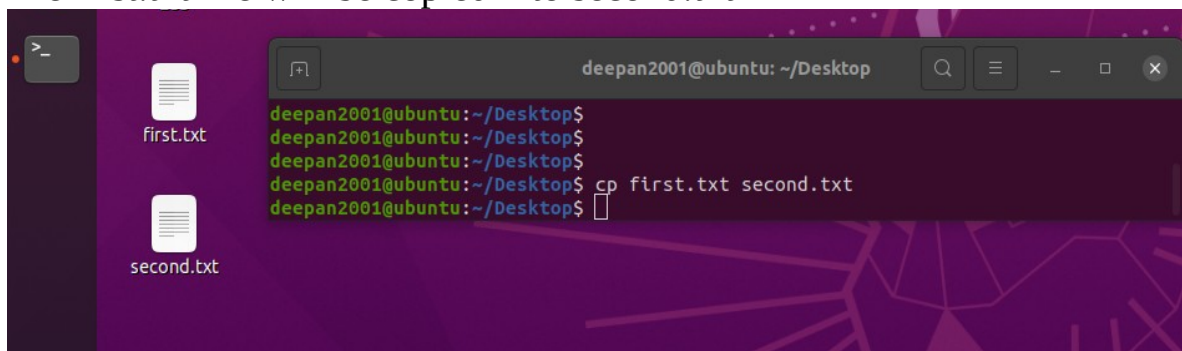
```
deepan2001@ubuntu: ~  
deepan2001@ubuntu:~$ ls -lh  
total 32K  
drwxr-xr-x 3 deepan2001 deepan2001 4.0K Feb 27 19:54 Desktop  
drwxr-xr-x 2 deepan2001 deepan2001 4.0K Jan 18 01:32 Documents  
drwxr-xr-x 2 deepan2001 deepan2001 4.0K Jan 18 01:32 Downloads  
drwxr-xr-x 2 deepan2001 deepan2001 4.0K Jan 18 01:32 Music  
drwxr-xr-x 2 deepan2001 deepan2001 4.0K Jan 18 01:32 Pictures  
drwxr-xr-x 2 deepan2001 deepan2001 4.0K Jan 18 01:32 Public  
drwxr-xr-x 2 deepan2001 deepan2001 4.0K Jan 18 01:32 Templates  
drwxr-xr-x 2 deepan2001 deepan2001 4.0K Jan 18 01:32 Videos  
deepan2001@ubuntu:~$
```

### 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



```
deepan2001@ubuntu: ~/Desktop  
deepan2001@ubuntu:~/Desktop$  
deepan2001@ubuntu:~/Desktop$  
deepan2001@ubuntu:~/Desktop$ cp first.txt second.txt  
deepan2001@ubuntu:~/Desktop$
```

### 4) mv

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

Options:

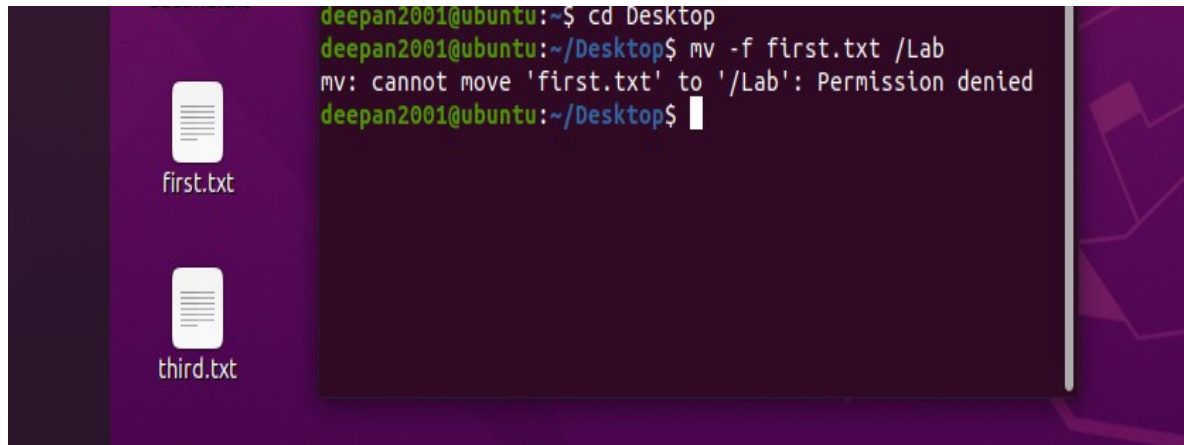
-f Forces the move.

-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

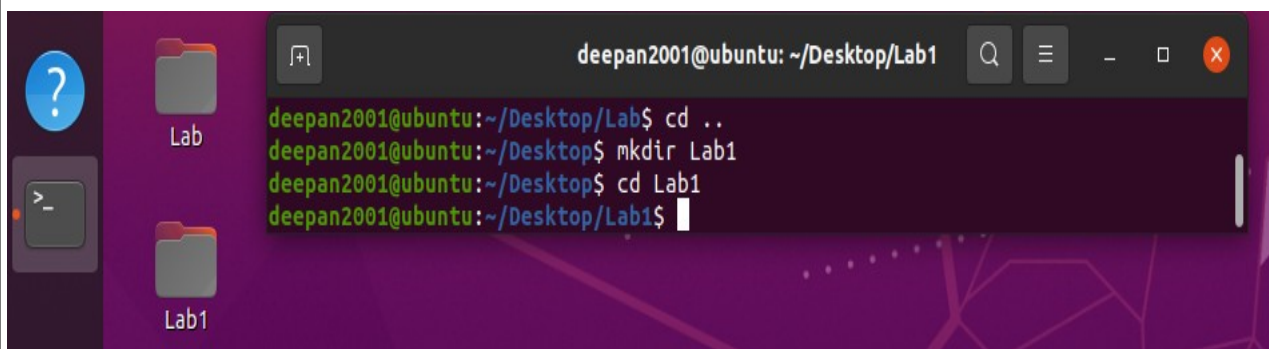


```
deepan2001@ubuntu:~$ cd Desktop
deepan2001@ubuntu:~/Desktop$ mv -f first.txt /Lab
mv: cannot move 'first.txt' to '/Lab': Permission denied
deepan2001@ubuntu:~/Desktop$
```

The image shows a terminal window with the above commands. To the left of the terminal, on the desktop, are two file icons labeled 'first.txt' and 'third.txt'.

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.

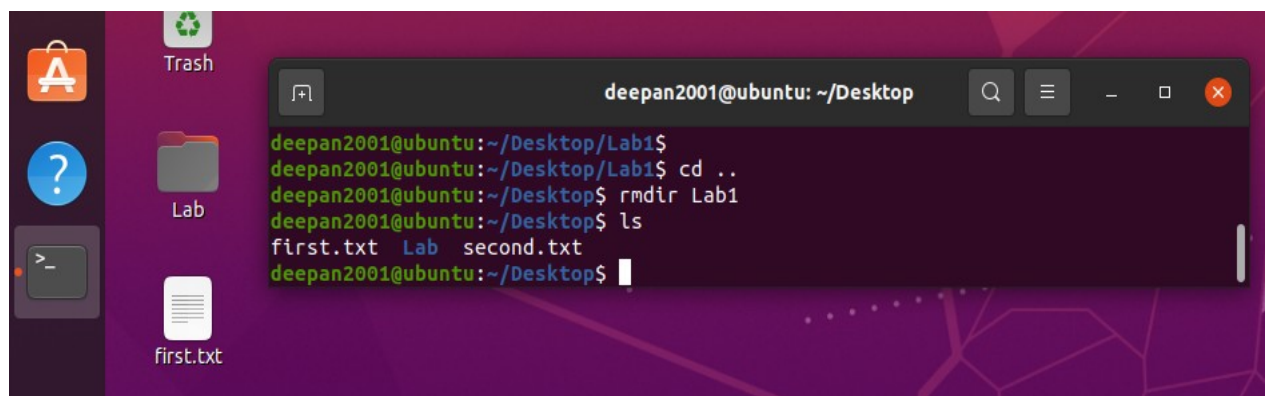
\$ mkdir MyDir



```
deepan2001@ubuntu: ~/Desktop/Lab1
deepan2001@ubuntu:~/Desktop/Lab$ cd ..
deepan2001@ubuntu:~/Desktop$ mkdir Lab1
deepan2001@ubuntu:~/Desktop$ cd Lab1
deepan2001@ubuntu:~/Desktop/Lab1$
```

The image shows a terminal window with the above commands. On the desktop to the left, there are two folder icons labeled 'Lab' and 'Lab1'.

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



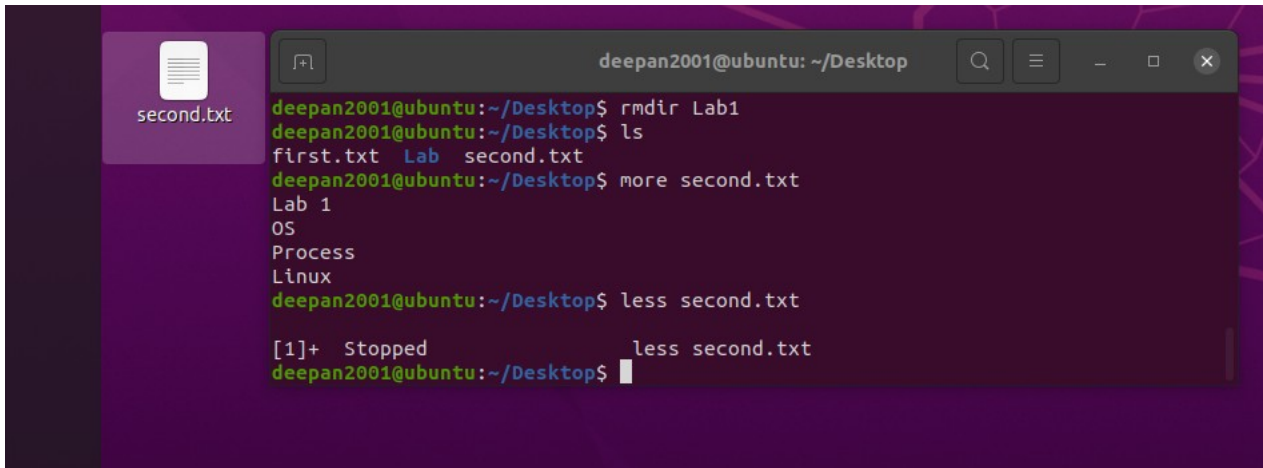
```
deepan2001@ubuntu: ~/Desktop
deepan2001@ubuntu:~/Desktop/Lab1$ cd ..
deepan2001@ubuntu:~/Desktop$ rmdir Lab1
deepan2001@ubuntu:~/Desktop$ ls
first.txt  Lab  second.txt
deepan2001@ubuntu:~/Desktop$
```

The image shows a terminal window with the above commands. On the desktop to the left, there is a folder icon labeled 'Lab' and a file icon labeled 'first.txt'.



## 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.



A terminal window titled 'deepan2001@ubuntu: ~/Desktop' shows the following commands and output:

```
deepan2001@ubuntu:~/Desktop$ rmdir Lab1
deepan2001@ubuntu:~/Desktop$ ls
first.txt  Lab  second.txt
deepan2001@ubuntu:~/Desktop$ more second.txt
Lab 1
OS
Process
Linux
deepan2001@ubuntu:~/Desktop$ less second.txt

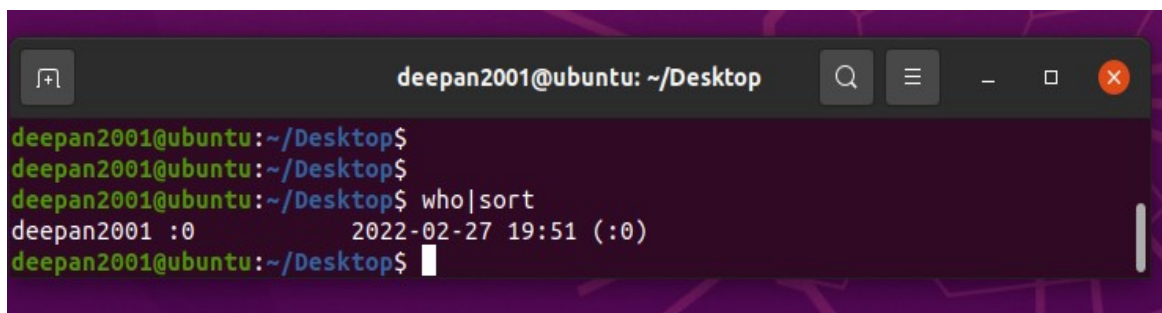
[1]+  Stopped                  less second.txt
deepan2001@ubuntu:~/Desktop$
```

## 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



A terminal window titled 'deepan2001@ubuntu: ~/Desktop' shows the following commands and output:

```
deepan2001@ubuntu:~/Desktop$
deepan2001@ubuntu:~/Desktop$
deepan2001@ubuntu:~/Desktop$ who|sort
deepan2001 :0                2022-02-27 19:51 (:0)
deepan2001@ubuntu:~/Desktop$
```

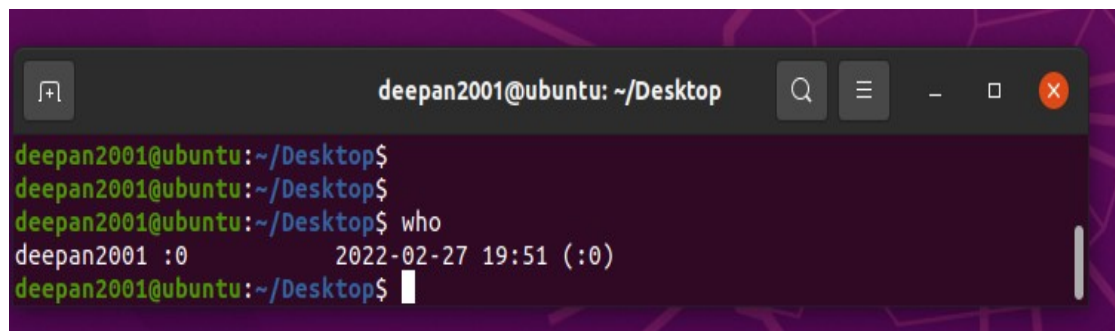
## 9) who

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
```

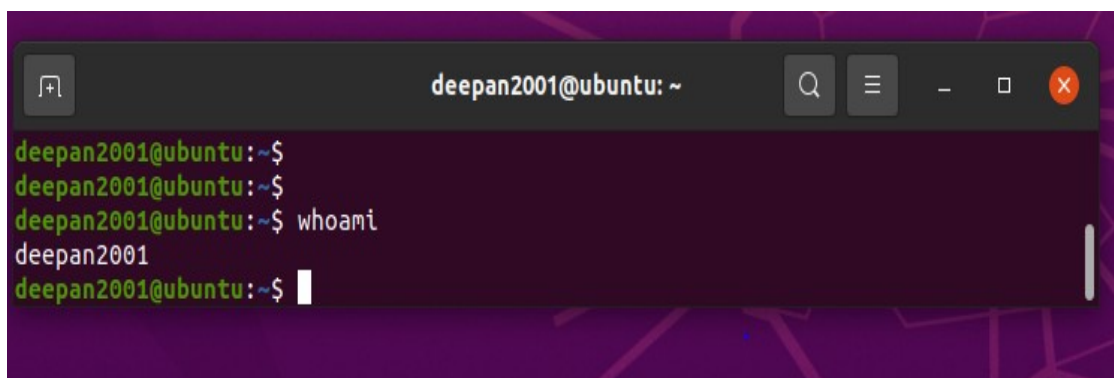
This is just Linux's way of saying that 'root' started working on terminal 1 on May 20 at 9:48 in the morning and nitin started working on terminal 2 at 10:05. This is mainly used in networked situations so the system administrator knows who's working.

A terminal window titled 'deepan2001@ubuntu: ~/Desktop' with search, menu, and window control icons. The terminal shows the user 'deepan2001' at the prompt '~/' in the directory '~/Desktop'. The user enters 'who' and the output is 'deepan2001 :0 2022-02-27 19:51 (:0)'.

```
deepan2001@ubuntu:~/Desktop$  
deepan2001@ubuntu:~/Desktop$  
deepan2001@ubuntu:~/Desktop$ who  
deepan2001 :0 2022-02-27 19:51 (:0)  
deepan2001@ubuntu:~/Desktop$
```

## 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.

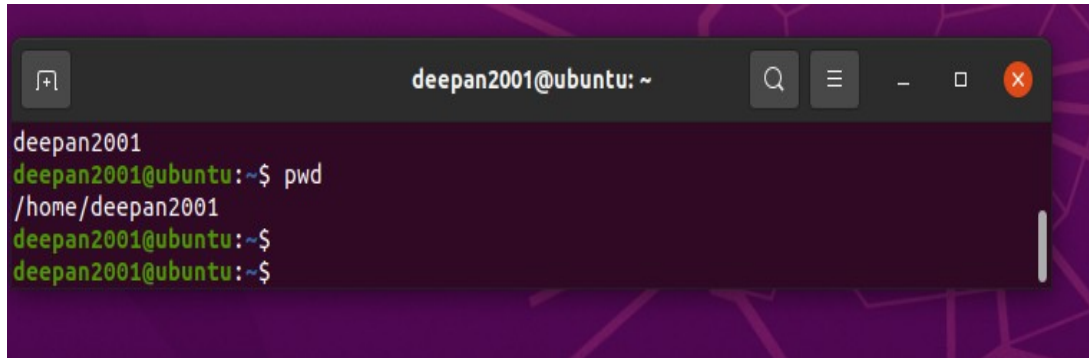
A terminal window titled 'deepan2001@ubuntu: ~' with search, menu, and window control icons. The terminal shows the user 'deepan2001' at the prompt '~\$'. The user enters 'whoami' and the output is 'deepan2001'.

```
deepan2001@ubuntu:~$  
deepan2001@ubuntu:~$  
deepan2001@ubuntu:~$ whoami  
deepan2001  
deepan2001@ubuntu:~$
```

## 11) pwd (print working directory) :

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

\$ pwd

A terminal window titled 'deepan2001@ubuntu: ~' with search, menu, and window control icons. The prompt is 'deepan2001'. The command 'deepan2001@ubuntu:~\$ pwd' is entered, and the output is '/home/deepan2001'. The prompt then returns to 'deepan2001@ubuntu:~\$' twice.

```
deepan2001
deepan2001@ubuntu:~$ pwd
/home/deepan2001
deepan2001@ubuntu:~$
deepan2001@ubuntu:~$
```

## 12) cat :

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

The syntax for the cat command is:

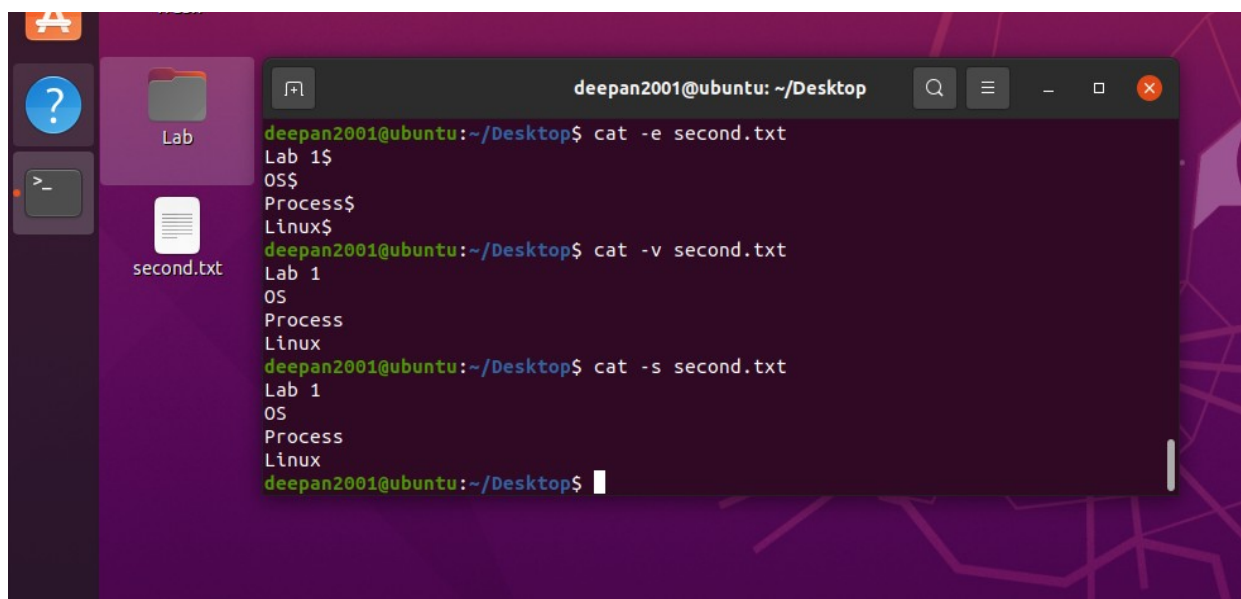
cat [options] [files]

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

A terminal window titled 'deepan2001@ubuntu: ~/Desktop' with search, menu, and window control icons. On the desktop, there is a folder named 'Lab' and a file named 'second.txt'. The terminal shows three commands and their outputs: 1. 'cat -e second.txt' outputs 'Lab 1\$', 'OS\$', 'Process\$', 'Linux\$', and returns the prompt. 2. 'cat -v second.txt' outputs 'Lab 1', 'OS', 'Process', 'Linux', and returns the prompt. 3. 'cat -s second.txt' outputs 'Lab 1', 'OS', 'Process', 'Linux', and returns the prompt.

```
deepan2001@ubuntu: ~/Desktop$ cat -e second.txt
Lab 1$
OS$
Process$
Linux$
deepan2001@ubuntu:~/Desktop$ cat -v second.txt
Lab 1
OS
Process
Linux
deepan2001@ubuntu:~/Desktop$ cat -s second.txt
Lab 1
OS
Process
Linux
deepan2001@ubuntu:~/Desktop$
```



### 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

```
CAT(1)                                User Commands                                CAT(1)

NAME
  cat - concatenate files and print on the standard output

SYNOPSIS
  cat [OPTION]... [FILE]...

DESCRIPTION
  Concatenate FILE(s) to standard output.

  With no FILE, or when FILE is -, read standard input.

  -A, --show-all
      equivalent to -vET

  -b, --number-nonblank
      number nonempty output lines, overrides -n

  -e
      equivalent to -vE

  -E, --show-ends
      display $ at end of each line

  -n, --number
      number all output lines

  -s, --squeeze-blank
      suppress repeated empty output lines

  -t
      equivalent to -vT

  -T, --show-tabs
      display TAB characters as ^I

  -u
      (ignored)

  -v, --show-nonprinting
      use ^ and M- notation, except for LFD and TAB

  --help display this help and exit

  --version
      output version information and exit

Manual page cat(1) line 1 (press h for help or q to quit)
```

```
--version
  output version information and exit

EXAMPLES
  cat f - g
      Output f's contents, then standard input, then g's contents.

  cat
      Copy standard input to standard output.

AUTHOR
  Written by Torbjorn Granlund and Richard M. Stallman.

REPORTING BUGS
  GNU coreutils online help: <https://www.gnu.org/software/coreutils/>
  Report cat translation bugs to <https://translationproject.org/team/>

COPYRIGHT
  Copyright © 2018 Free Software Foundation, Inc. License GPLv3+: GNU GPL version 3 or later <https://gnu.org/licenses/gpl.html>.
  This is free software: you are free to change and redistribute it. There is NO WARRANTY, to the extent permitted by law.

SEE ALSO
  tac(1)

  Full documentation at: <https://www.gnu.org/software/coreutils/cat>
  or available locally via: info '(coreutils) cat invocation'

GNU coreutils 8.30
Manual page cat(1) line 24/69 (END) (press h for help or q to quit)

September 2019
```

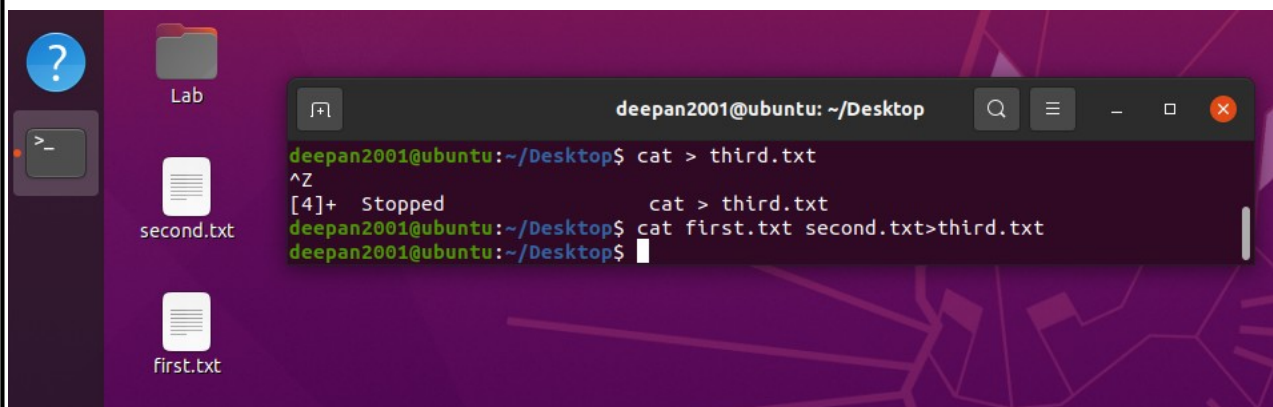
#### 14) cat command :

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 (stdout). 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)

A screenshot of a Linux desktop environment with a purple background. On the left sidebar, there is a help icon (question mark), a terminal icon, and a file manager icon. On the desktop, there are three files: 'Lab' (a folder), 'second.txt', and 'first.txt'. A terminal window is open in the center, showing the following commands and output:

```
deepan2001@ubuntu: ~/Desktop
deepan2001@ubuntu:~/Desktop$ cat > third.txt
^Z
[4]+  Stopped                  cat > third.txt
deepan2001@ubuntu:~/Desktop$ cat first.txt second.txt>third.txt
deepan2001@ubuntu:~/Desktop$
```

#### 15) touch command :

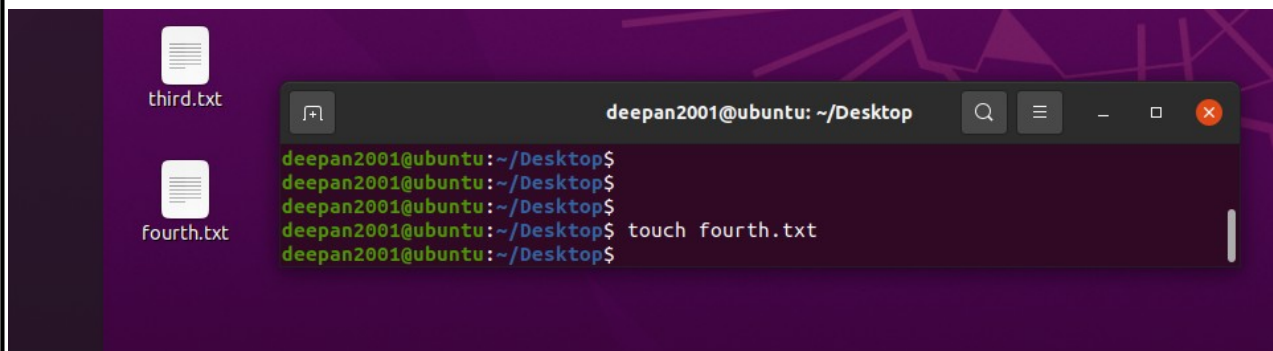
The touch command in Linux is used to create a new file without any content inside it.

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
```



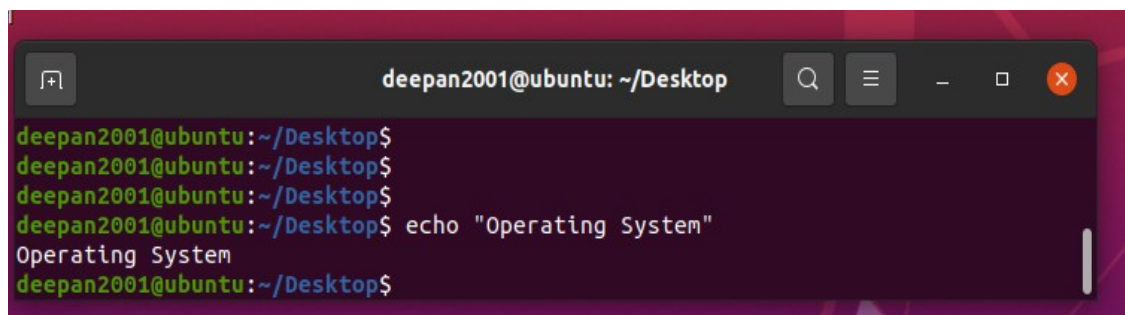
### 16) echo :

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`

```
deepan2001@ubuntu:~$ tree
.
├── Desktop
│   ├── fifth.txt
│   ├── first.txt
│   ├── fourth.txt
│   └── Lab
│       ├── a.out
│       ├── demo.c
│       ├── New
│       ├── New.c
│       ├── Prog1.c
│       ├── Prog2.c
│       ├── Prog3.c
│       ├── Prog4.c
│       ├── Prog5.c
│       ├── Prog6.c
│       ├── Prog7.c
│       ├── Sample_Prog1.c
│       ├── Sample_Prog2.c
│       ├── Sample_Prog3.c
│       ├── Sample_Prog4.c
│       ├── Test
│       ├── Test.c
│       ├── second.txt
│       └── third.txt
├── Documents
├── Downloads
├── Music
├── Pictures
├── Public
├── Templates
└── Videos

9 directories, 22 files
deepan2001@ubuntu:~$
```

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

\$ tree -f

```
deepan2001@ubuntu:~/Desktop$ tree -f
.
├── ./first.txt
├── ./fourth.txt
└── ./Lab
    ├── ./Lab/a.out
    ├── ./Lab/demo.c
    ├── ./Lab/New
    ├── ./Lab/New.c
    ├── ./Lab/Prog1.c
    ├── ./Lab/Prog2.c
    ├── ./Lab/Prog3.c
    ├── ./Lab/Prog4.c
    ├── ./Lab/Prog5.c
    ├── ./Lab/Prog6.c
    ├── ./Lab/Prog7.c
    ├── ./Lab/Sample_Prog1.c
    ├── ./Lab/Sample_Prog2.c
    ├── ./Lab/Sample_Prog3.c
    ├── ./Lab/Sample_Prog4.c
    ├── ./Lab/Test
    ├── ./Lab/Test.c
    ├── ./second.txt
    └── ./third.txt

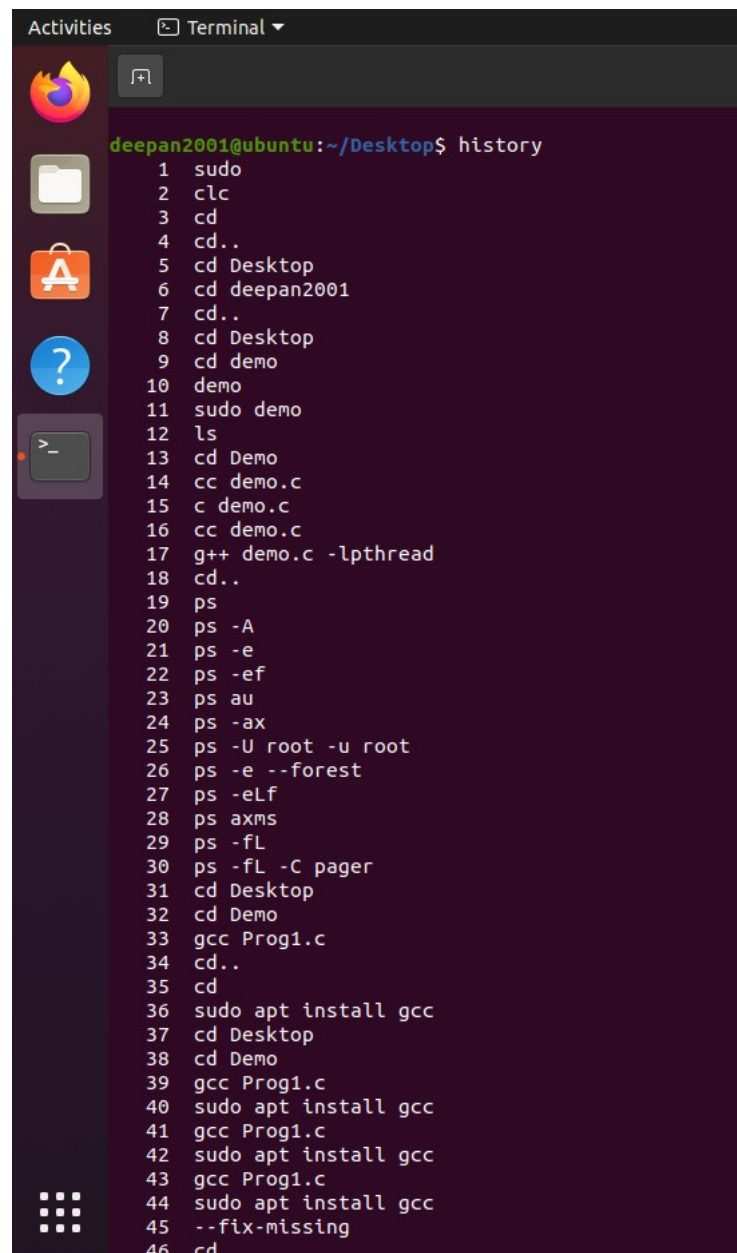
1 directory, 21 files
deepan2001@ubuntu:~/Desktop$
```

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

A screenshot of a Linux terminal window. The window has a title bar with 'Activities' and 'Terminal'. On the left is a sidebar with icons for the Dash, Home, Applications, and a search icon. The terminal itself has a dark purple background. The prompt is 'deepan2001@ubuntu:~/Desktop\$'. The command 'history' has been entered, and the output is a list of 46 numbered commands. The commands include directory navigation (cd, cd..), file operations (ls, gcc, g++), system administration (sudo, ps), and package management (apt install).

```
deepan2001@ubuntu:~/Desktop$ history
1  sudo
2  clc
3  cd
4  cd..
5  cd Desktop
6  cd deepan2001
7  cd..
8  cd Desktop
9  cd demo
10 demo
11 sudo demo
12 ls
13 cd Demo
14 cc demo.c
15 c demo.c
16 cc demo.c
17 g++ demo.c -lpthread
18 cd..
19 ps
20 ps -A
21 ps -e
22 ps -ef
23 ps au
24 ps -ax
25 ps -U root -u root
26 ps -e --forest
27 ps -eLf
28 ps axms
29 ps -fL
30 ps -fL -C pager
31 cd Desktop
32 cd Demo
33 gcc Prog1.c
34 cd..
35 cd
36 sudo apt install gcc
37 cd Desktop
38 cd Demo
39 gcc Prog1.c
40 sudo apt install gcc
41 gcc Prog1.c
42 sudo apt install gcc
43 gcc Prog1.c
44 sudo apt install gcc
45 --fix-missing
46 cd
```

## 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
amdxtata	amdxtata	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	
browser	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

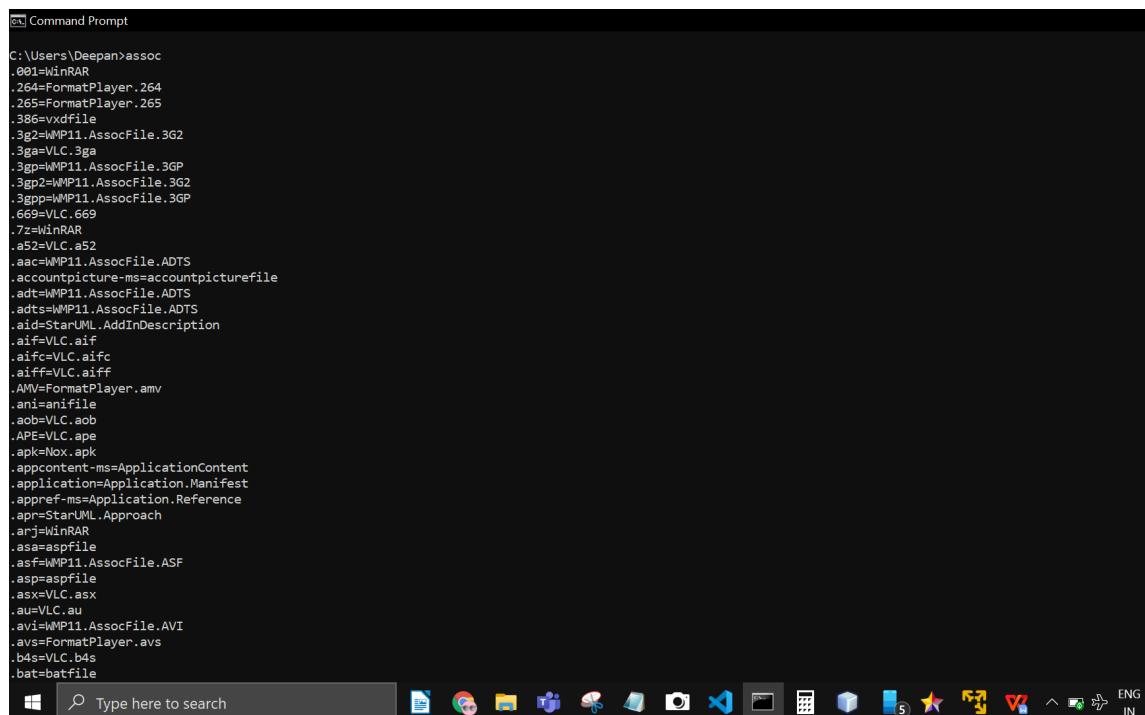
D:\Deepan>

```

## 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.**



```

C:\Users\Deepan>assoc
.001=WinRAR
.264=FormatPlayer.264
.265=FormatPlayer.265
.386=vxdFile
.3g2=MP11.AssocFile.3G2
.3ga=VLC.3ga
.3gp=MP11.AssocFile.3GP
.3gp2=MP11.AssocFile.3G2
.3gpp=MP11.AssocFile.3GP
.669=VLC.669
.7z=WinRAR
.a52=VLC.a52
.aac=MP11.AssocFile.ADTS
.accountpicture-ms=accountpicturefile
.adts=MP11.AssocFile.ADTS
.adts=MP11.AssocFile.ADTS
.aid=StarUML.AddInDescription
.aif=VLC.aif
.aifc=VLC.aifc
.aiff=VLC.aiff
.AMV=FormatPlayer.amv
.ani=anifile
.aob=VLC.aob
.APE=VLC.ape
.apk=Nox.apk
.appcontent-ms=ApplicationContent
.application=Application.Manifest
.appref-ms=Application.Reference
.apr=StarUML.Approach
.arj=WinRAR
.asa=aspfile
.asf=MP11.AssocFile.ASF
.asp=aspfile
.asx=VLC.asx
.au=VLC.au
.avi=MP11.AssocFile.AVI
.avs=FormatPlayer.avs
.b4s=VLC.b4s
.bat=batfile

```

**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.

```
deepan2001@ubuntu:~/Desktop$ /proc
bash: /proc: Is a directory
deepan2001@ubuntu:~/Desktop$ cd /proc
deepan2001@ubuntu:/proc$ ls
1  11  120 134 1415 15  1650 1729 1770 198 206 219 230 242 252 260 33 389 417 736 809 90  bootconfig  execdomains  kpagecgroup  pagetypeinfo  thread-self
10 110 121 135 1419 1505 1651 1739 1776 199 207 22 231 243 253 2621 352 391 5 737 81 92  buddyinfo    fb            kpagecount   partitions     timer_list
100 111 122 1355 1424 152 1655 1741 1781 2 208 220 232 244 254 2624 374 393 544 745 817 928  bus          filesystems  kpageflags   pressure       tty
1006 112 123 136 1427 153 1658 1746 1784 20 209 221 233 245 2546 28 375 395 6 748 82 93  cgroups      fs            loadavg      schedstat      uptime
101 113 124 137 1447 1573 1667 1748 1792 200 210 222 234 246 255 287 377 396 684 751 826 939  cmdline      interrupts   locks        scsi           version
102 1133 125 138 1450 158 1671 1749 1794 201 211 223 235 247 2557 288 378 398 685 759 83 945  consoles     iomen        mdstat       self           version_signature
103 114 126 1392 1453 1594 1674 1752 1796 2014 212 224 236 248 256 29 379 399 700 765 839 95  cpuinfo       ioports      meminfo      slabinfo       vmallocinfo
104 115 127 14 1457 1599 1682 1755 18 2023 213 225 237 2487 2568 3 380 4 703 766 84 96  crypto        irq           misc         softirqs       vnstat
105 116 128 1400 1462 16 1691 1757 180 2029 214 226 238 249 257 30 382 401 725 769 85 97  devices       kallsyms     modules      stat           zoneinfo
106 117 13 1401 1469 1605 1699 1758 1829 203 215 227 239 25 2572 31 383 403 726 772 86 98  diskstats     kcore        mounts       swaps
107 118 131 1406 1471 1612 17 1761 1837 2035 216 228 24 250 258 311 386 408 730 773 87 99  dma           keys         npt          sys            sysrq-trigger
108 119 132 1409 1475 1626 1703 1762 1845 204 217 229 240 2508 259 312 387 411 734 780 88  acpi          driver       key-users    ntrr          sysvipc
109 12 133 1411 149 1646 1721 1764 19 205 218 23 241 251 26 32 388 412 735 80 9  asound        dynamic_debug  knsg         net
```

## 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

```
Activities Terminal Feb 27 10:29
deepan2001@ubuntu: ~/Desktop/Lab$ cat /proc/cpuinfo
processor       : 0
vendor_id      : GenuineIntel
cpu family     : 6
cpu model     : 142
model name     : Intel(R) Core(TM) i5-8265U CPU @ 1.60GHz
stepping      : 11
microcode     : 0x98
cpu MHz       : 1800.002
cache size    : 6144 KB
physical id    : 0
siblings      : 1
core id       : 0
cpu cores     : 1
apicid        : 0
initial apicid : 0
fpu           : yes
fpu_exception : yes
cpuid level   : 22
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge nca cmov pat pse36 clflush mmx fxsr sse sse2 ss syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon nopl xtopology tsc_reliable n
onstop_tsc cpuid pni pclmulqdq sse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm abm 3dnowprefetch cpuid_fault invpcid_single ssbd ibrs
_1bpb stibp fsgsbase tsc_adjust bmt1 avx2 smep bmt2 invpcid rdseed adx snap clflushopt xsaveopt xsavec xgetbv1 xsaves arat flush_lid arch_capabilities
bugs          : spectre_v1 spectre_v2 spec_store_bypass nds swapgs itlb_multihit srbds
bogomips      : 3600.00
clflush size  : 64
cache_alignm  : 64
address sizes  : 45 bits physical, 48 bits virtual
power managem :

processor       : 1
vendor_id      : GenuineIntel
cpu family     : 6
cpu model     : 142
model name     : Intel(R) Core(TM) i5-8265U CPU @ 1.60GHz
stepping      : 11
microcode     : 0x98
cpu MHz       : 1800.002
cache size    : 6144 KB
physical id    : 2
siblings      : 1
core id       : 0
cpu cores     : 1
apicid        : 2
initial apicid : 2
fpu           : yes
fpu_exception : yes
cpuid level   : 22
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge nca cmov pat pse36 clflush mmx fxsr sse sse2 ss syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon nopl xtopology tsc_reliable n
onstop_tsc cpuid pni pclmulqdq sse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm abm 3dnowprefetch cpuid_fault invpcid_single ssbd ibrs
_1bpb stibp fsgsbase tsc_adjust bmt1 avx2 smep bmt2 invpcid rdseed adx snap clflushopt xsaveopt xsavec xgetbv1 xsaves arat flush_lid arch_capabilities
bugs          : spectre_v1 spectre_v2 spec_store_bypass nds swapgs itlb_multihit srbds
bogomips      : 3600.00
clflush size  : 64
cache_alignm  : 64
address sizes  : 45 bits physical, 48 bits virtual
power managem :
deepan2001@ubuntu:~/Desktop/Lab$
```

```
Activities Terminal Feb 27 10:29
deepan2001@ubuntu: ~/Desktop/Lab$
cpu cores     : 1
apicid        : 0
initial apicid : 0
fpu           : yes
fpu_exception : yes
cpuid level   : 22
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge nca cmov pat pse36 clflush mmx fxsr sse sse2 ss syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon nopl xtopology tsc_reliable n
onstop_tsc cpuid pni pclmulqdq sse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm abm 3dnowprefetch cpuid_fault invpcid_single ssbd ibrs
_1bpb stibp fsgsbase tsc_adjust bmt1 avx2 smep bmt2 invpcid rdseed adx snap clflushopt xsaveopt xsavec xgetbv1 xsaves arat flush_lid arch_capabilities
bugs          : spectre_v1 spectre_v2 spec_store_bypass nds swapgs itlb_multihit srbds
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processor       : 1
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stepping      : 11
microcode     : 0x98
cpu MHz       : 1800.002
cache size    : 6144 KB
physical id    : 2
siblings      : 1
core id       : 0
cpu cores     : 1
apicid        : 2
initial apicid : 2
fpu           : yes
fpu_exception : yes
cpuid level   : 22
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge nca cmov pat pse36 clflush mmx fxsr sse sse2 ss syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon nopl xtopology tsc_reliable n
onstop_tsc cpuid pni pclmulqdq sse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm abm 3dnowprefetch cpuid_fault invpcid_single ssbd ibrs
_1bpb stibp fsgsbase tsc_adjust bmt1 avx2 smep bmt2 invpcid rdseed adx snap clflushopt xsaveopt xsavec xgetbv1 xsaves arat flush_lid arch_capabilities
bugs          : spectre_v1 spectre_v2 spec_store_bypass nds swapgs itlb_multihit srbds
bogomips      : 3600.00
clflush size  : 64
cache_alignm  : 64
address sizes  : 45 bits physical, 48 bits virtual
power managem :
deepan2001@ubuntu:~/Desktop/Lab$
```

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



```
deepan2001@ubuntu: ~/Desktop/Lab$ uname -a
Linux ubuntu 5.11.0-46-generic #51-20.04.1-Ubuntu SMP Fri Jan 7 06:51:40 UTC 2022 x86_64 x86_64 x86_64 GNU/Linux
deepan2001@ubuntu:~/Desktop/Lab$
```

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

```
deepan2001@ubuntu:~/Desktop/Lab$ uptime
10:31:42 up 1:11, 1 user, load average: 0.16, 0.08, 0.04
deepan2001@ubuntu:~/Desktop/Lab$
```

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

```
Activities Terminal Feb 27 10:34
deepan2001@ubuntu:~/Desktop/Lab$ top
top - 10:34:22 up 1:13, 1 user, load average: 0.01, 0.04, 0.03
Tasks: 289 total, 1 running, 283 sleeping, 5 stopped, 0 zombie
%Cpu(s): 1.2 us, 1.0 sy, 0.0 ni, 97.8 id, 0.0 wa, 0.0 hi, 0.0 st, 0.0 st
MiB Mem : 1948.1 total, 161.5 free, 947.1 used, 839.4 buff/cache
MiB Swap: 923.3 total, 923.3 free, 0.0 used, 845.4 avail Mem

  PID USER      PR  NI  VIRT  RES  SHR S  %CPU  %MEM    TIME+ COMMAND
1463 deepan2+  20   0 305068 79352 40188 S   2.3   4.0   0:50.54 Xorg
2243 deepan2+  20   0 824144 52092 39136 S   1.7   2.6   0:17.06 gnome-terminal-
1633 deepan2+  20   0 4038100 235712 103000 S   1.0  11.8   1:34.90 gnome-shell
 711 root      20   0 248076 7304 6300 S   0.7   0.4   0:08.34 vmtocsd
1832 deepan2+  20   0 304184 44940 30228 S   0.3   2.3   0:11.21 vmtocsd
2644 root      20   0 0 0 0 I   0.3   0.0   0:00.13 kworker/u256:2-events_freezable_power_
2647 root      20   0 0 0 0 I   0.3   0.0   0:01.57 kworker/1:1-events
  1 root      20   0 167560 11408 8356 S   0.0   0.6   0:05.71 systemd
  2 root      20   0 0 0 0 S   0.0   0.0   0:00.04 kthreadd
  3 root      0 -20 0 0 0 I   0.0   0.0   0:00.00 rcu_gp
  4 root      0 -20 0 0 0 I   0.0   0.0   0:00.00 rcu_par_gp
  6 root      0 -20 0 0 0 I   0.0   0.0   0:00.00 kworker/0:0H-events_highpri
  9 root      0 -20 0 0 0 I   0.0   0.0   0:00.00 rm_percpu_wq
10 root      0 -20 0 0 0 S   0.0   0.0   0:00.00 rcu_tasks_rude_
11 root      20   0 0 0 0 S   0.0   0.0   0:00.00 rcu_tasks_trace
12 root      20   0 0 0 0 S   0.0   0.0   0:00.21 ksoftirqd/0
13 root      20   0 0 0 0 I   0.0   0.0   0:01.35 rcu_sched
14 root      rt   0 0 0 0 S   0.0   0.0   0:00.06 migration/0
15 root     -51   0 0 0 0 S   0.0   0.0   0:00.00 idle_inject/0
16 root      20   0 0 0 0 S   0.0   0.0   0:00.00 cpup/p0
17 root      20   0 0 0 0 S   0.0   0.0   0:00.00 cpup/p1
18 root     -51   0 0 0 0 S   0.0   0.0   0:00.00 idle_inject/1
19 root      rt   0 0 0 0 S   0.0   0.0   0:00.49 migration/1
20 root      20   0 0 0 0 S   0.0   0.0   0:00.24 ksoftirqd/1
22 root      0 -20 0 0 0 I   0.0   0.0   0:00.00 kworker/1:0H-events_highpri
23 root      20   0 0 0 0 S   0.0   0.0   0:00.00 kdevtmpfs
24 root      0 -20 0 0 0 I   0.0   0.0   0:00.00 netns
25 root      0 -20 0 0 0 I   0.0   0.0   0:00.00 inet_frag_wq
26 root      20   0 0 0 0 S   0.0   0.0   0:00.00 kauditd
28 root      20   0 0 0 0 S   0.0   0.0   0:00.01 khungtaskd
29 root      20   0 0 0 0 S   0.0   0.0   0:00.00 oon_reaper
30 root      0 -20 0 0 0 I   0.0   0.0   0:00.00 writeback
31 root      20   0 0 0 0 S   0.0   0.0   0:00.34 kcompactd0
32 root      25   5 0 0 0 S   0.0   0.0   0:00.00 ksmd
33 root      39  19 0 0 0 S   0.0   0.0   0:00.00 khugepaged
80 root      0 -20 0 0 0 I   0.0   0.0   0:00.00 kintegrityd
81 root      0 -20 0 0 0 I   0.0   0.0   0:00.00 kblockd
82 root      0 -20 0 0 0 I   0.0   0.0   0:00.00 blkcg_punt_bto
83 root      0 -20 0 0 0 I   0.0   0.0   0:00.00 tpm_dev_wq
```

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

```
Activities Terminal Feb 27 10:36 deepan2001@ubuntu: ~/Desktop/Lab$ cat /proc/meminfo
MemTotal: 1994868 kB
MemFree: 158596 kB
MemAvailable: 858920 kB
Buffers: 52548 kB
Cached: 740408 kB
SwapCached: 0 kB
Active: 341696 kB
Inactive: 965572 kB
Active(anon): 1548 kB
Inactive(anon): 507404 kB
Active(file): 340148 kB
Inactive(file): 458168 kB
Unevictable: 0 kB
Mlocked: 0 kB
SwapTotal: 945416 kB
SwapFree: 945416 kB
Dirty: 108 kB
Writeback: 0 kB
AnonPages: 514364 kB
Mapped: 233060 kB
Shmem: 2396 kB
KReclaimable: 66724 kB
Slab: 138016 kB
SReclaimable: 66724 kB
SUnreclaim: 71292 kB
KernelStack: 10208 kB
PageTables: 12960 kB
NFS_Unstable: 0 kB
Bounce: 0 kB
WritebackTmp: 0 kB
CommitLimit: 1942848 kB
Committed_AS: 3286984 kB
VmallocTotal: 34359738367 kB
VmallocUsed: 57276 kB
VmallocChunk: 0 kB
Percpu: 89600 kB
HardwareCorrupted: 0 kB
AnonHugePages: 0 kB
ShmemHugePages: 0 kB
ShmemPmdMapped: 0 kB
FileHugePages: 0 kB
FilePmdMapped: 0 kB
HugePages_Total: 0
HugePages_Free: 0
HugePages_Rsvd: 0
HugePages_Surp: 0
Hugepagesize: 2048 kB
```

Total Memory : 1994868KB

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

```
Activities Terminal
deepan2001@ubuntu: ~/Desktop/Lab$ cat /proc/meminfo
MemTotal: 1994868 kB
MemFree: 158596 kB
MemAvailable: 858920 kB
Buffers: 52548 kB
Cached: 740408 kB
SwapCached: 0 kB
Active: 341696 kB
Inactive: 965572 kB
Active(anon): 1548 kB
Inactive(anon): 507404 kB
Active(file): 340148 kB
Inactive(file): 458168 kB
Unevictable: 0 kB
Mlocked: 0 kB
SwapTotal: 945416 kB
SwapFree: 945416 kB
Dirty: 108 kB
Writeback: 0 kB
AnonPages: 514364 kB
Mapped: 233060 kB
Shmem: 2396 kB
KReclaimable: 66724 kB
Slab: 138016 kB
SReclaimable: 66724 kB
SUnreclaim: 71292 kB
KernelStack: 10208 kB
PageTables: 12960 kB
NFS_Unstable: 0 kB
Bounce: 0 kB
WritebackTmp: 0 kB
CommitLimit: 1942848 kB
Committed_AS: 3286984 kB
VmallocTotal: 34359738367 kB
VmallocUsed: 57276 kB
VmallocChunk: 0 kB
Percpu: 89600 kB
HardwareCorrupted: 0 kB
AnonHugePages: 0 kB
ShmemHugePages: 0 kB
ShmemPmdMapped: 0 kB
FileHugePages: 0 kB
FilePmdMapped: 0 kB
HugePages_Total: 0
HugePages_Free: 0
HugePages_Rsvd: 0
HugePages_Surp: 0
Hugepagesize: 2048 kB
```

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

```
Activities ▾ Terminal ▾  
deepan2001@ubuntu: ~/C  
deepan2001@ubuntu:~/Desktop/Lab$ cat /proc/diskstats  
7      0 loop0 14 0 34 1 0 0 0 0 0 0 16 1 0 0 0 0 0 0  
7      1 loop1 43 0 694 37 0 0 0 0 0 0 48 37 0 0 0 0 0 0  
7      2 loop2 45 0 700 30 0 0 0 0 0 0 80 30 0 0 0 0 0 0  
7      3 loop3 48 0 718 34 0 0 0 0 0 0 56 34 0 0 0 0 0 0  
7      4 loop4 238 0 4276 91 0 0 0 0 0 0 372 91 0 0 0 0 0 0  
7      5 loop5 62 0 2134 49 0 0 0 0 0 0 184 49 0 0 0 0 0 0  
7      6 loop6 57 0 2112 126 0 0 0 0 0 0 120 126 0 0 0 0 0 0  
7      7 loop7 55 0 2146 65 0 0 0 0 0 0 68 65 0 0 0 0 0 0  
8      0 sda 15310 6220 1386052 14403 17449 13546 444306 18418 0 41912 32821 0 0 0 0 0 0 0  
8      1 sda1 172 1013 13494 126 2 0 2 1 0 176 127 0 0 0 0 0 0 0  
8      2 sda2 2 0 4 0 0 0 0 0 0 12 0 0 0 0 0 0 0 0  
8      5 sda5 15035 5207 1368370 14240 17447 13546 444304 18416 0 41820 32657 0 0 0 0 0 0 0  
11     0 sr0 11 0 5 2 0 0 0 0 0 0 24 2 0 0 0 0 0 0  
7      8 loop8 153 0 2534 74 0 0 0 0 0 0 148 74 0 0 0 0 0 0  
7      9 loop9 48 0 718 37 0 0 0 0 0 0 68 37 0 0 0 0 0 0  
7     10 loop10 878 0 61088 496 0 0 0 0 0 0 3824 496 0 0 0 0 0 0  
7     11 loop11 56 0 756 30 0 0 0 0 0 0 80 30 0 0 0 0 0 0  
7     12 loop12 11 0 28 1 0 0 0 0 0 0 12 1 0 0 0 0 0 0  
deepan2001@ubuntu:~/Desktop/Lab$
```

[illegible]

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

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

```
deepan2001@ubuntu:~$ ps
  PID TTY          TIME CMD
 1907 pts/0        00:00:00 bash
 2147 pts/0        00:00:00 cat
 2291 pts/0        00:00:00 ps
deepan2001@ubuntu:~$ /proc/[1907]/status
bash: /proc/1/status: Permission denied
deepan2001@ubuntu:~$ pid=1907
deepan2001@ubuntu:~$ grep ctxt /proc/$pid/status
voluntary_ctxt_switches:        287
nonvoluntary_ctxt_switches:    31
deepan2001@ubuntu:~$
```

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

[illegible]

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

