Operating System

Lab Manual

Session: Spring 2023

UET Lahore Pakistan

LAB 00

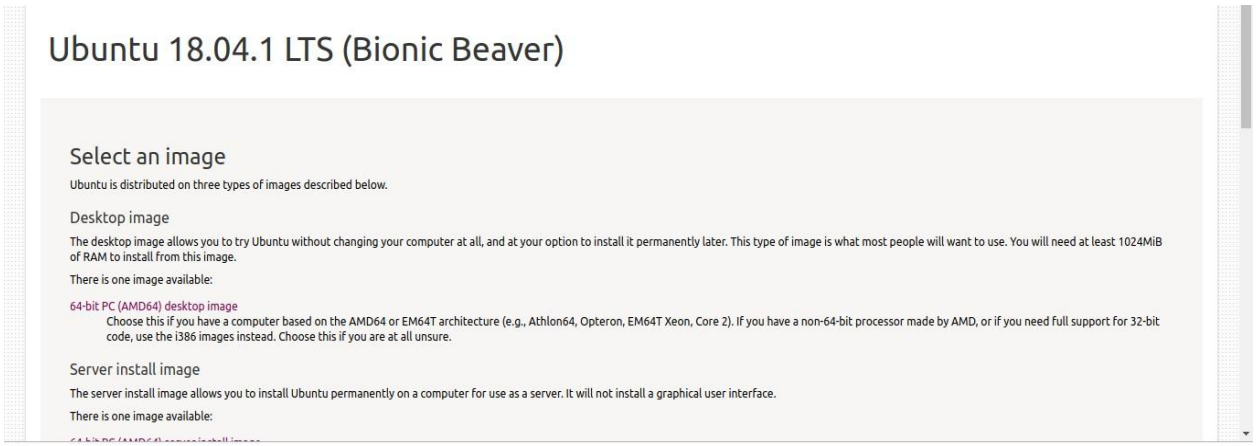
Virtual Machine Installation

Setting up Ubuntu with VirtualBox

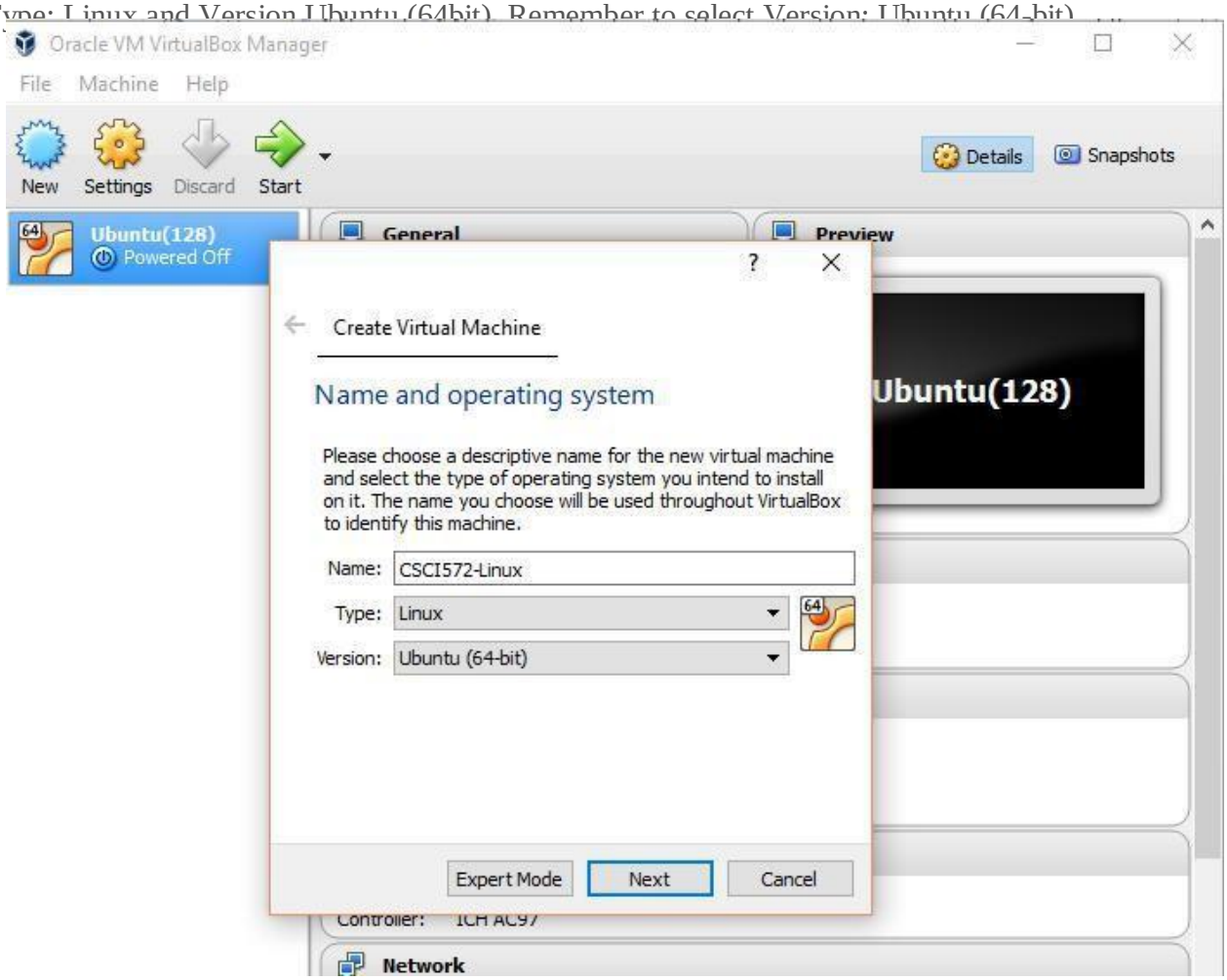
Following is an install guide for setting up VirtualBox with Ubuntu 16.04.3 on your system. If you have problems, more detailed instruction and troubleshooting tips can be found on the Ubuntu site.

1. Download the version of VirtualBox (https://www.virtualbox.org/wiki/Downloads) for your machine (under "VirtualBox platform packages", choose the host package that corresponds to your operating system (i.e. if you're installing on Mac, choose the package "VirtualBox 5.2.0 for OS X hosts", if you're installing on Windows, choose the package "VirutalBox 5.2.0 for Windows Hosts).

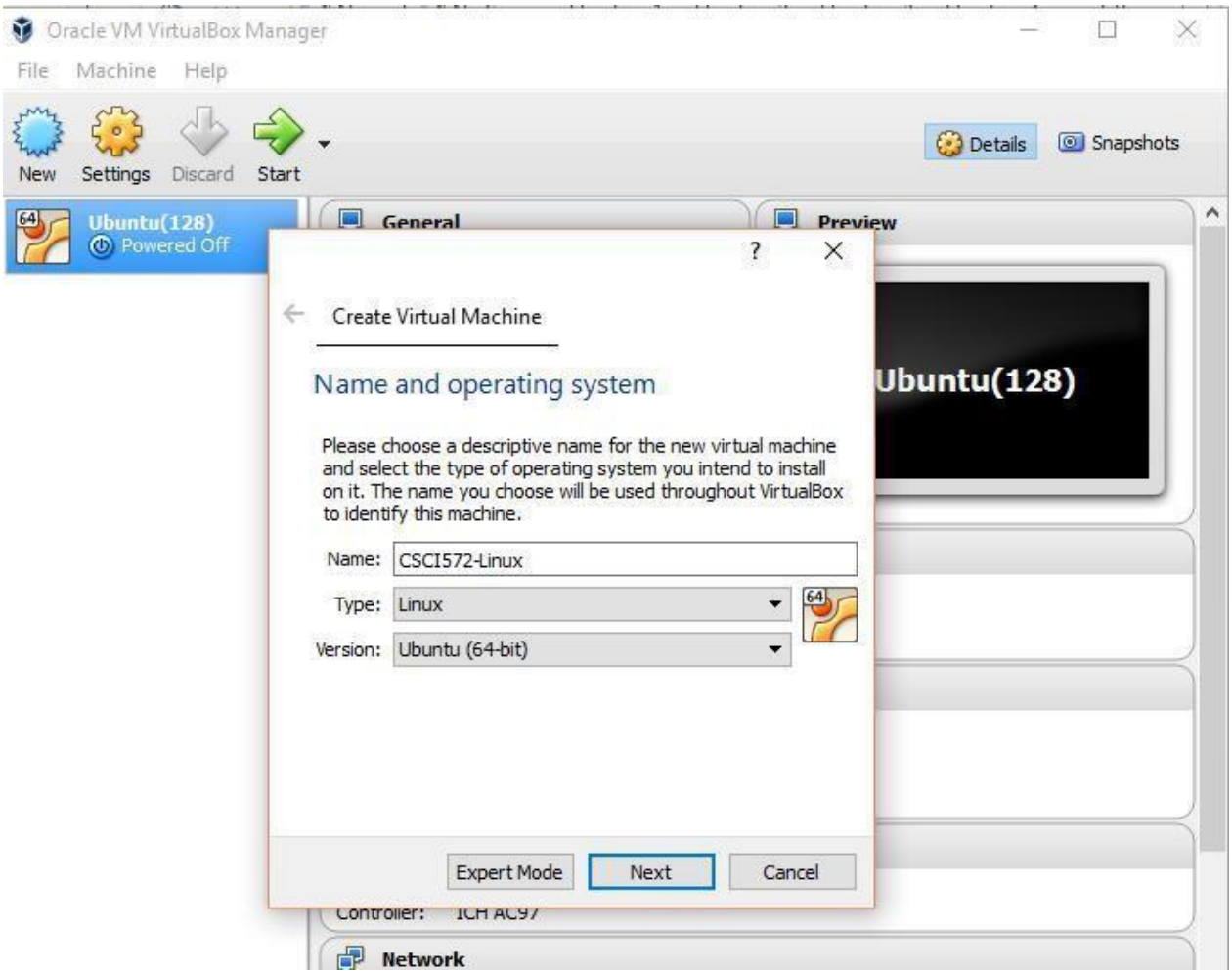
2. Download the 64 bit version of Ubuntu Linux 18.04 LTS (http://releases.ubuntu.com/releases/).
3. If your system has less than 2GB RAM select the 32 bit version



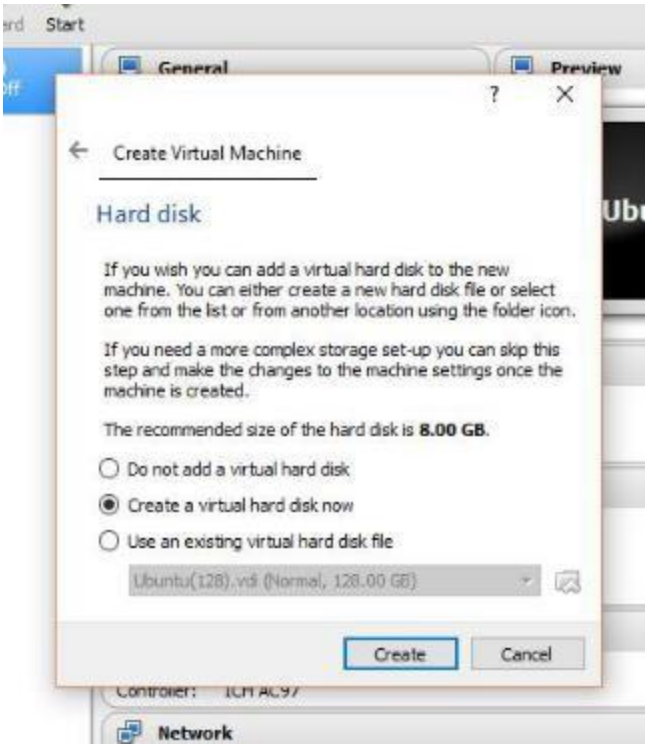
4. Run the VirtualBox-5.2.0-118431-Win.exe file and follow the Installer wizard
5. After the installation, open the VirtualBox applications
6. Select "New" from the application ribbon, choose a name for your system, and select Type: Linux and Version Ubuntu (64bit). Remember to select Version: Ubuntu (64-bit)



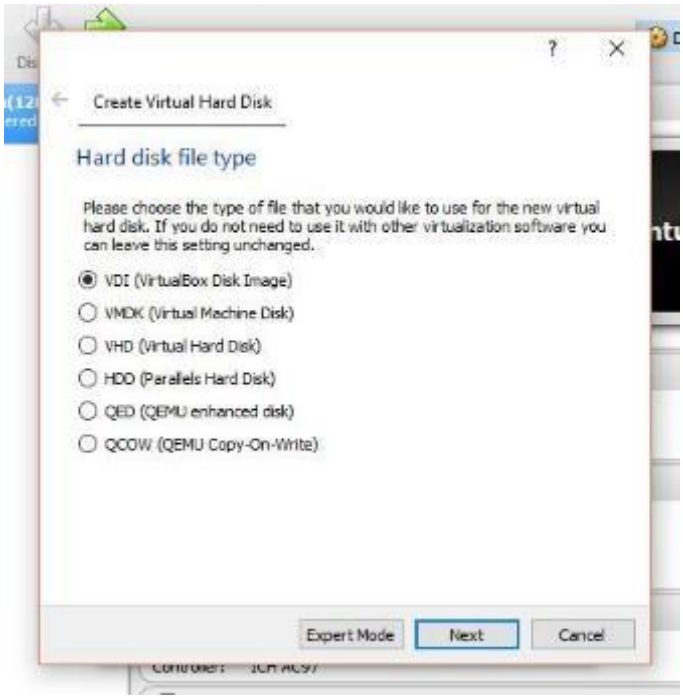
Select the amount of memory for your virtual machine (If you have 4GB of RAM or more, generally set this to 2048MB or half your system RAM, whichever is greater).



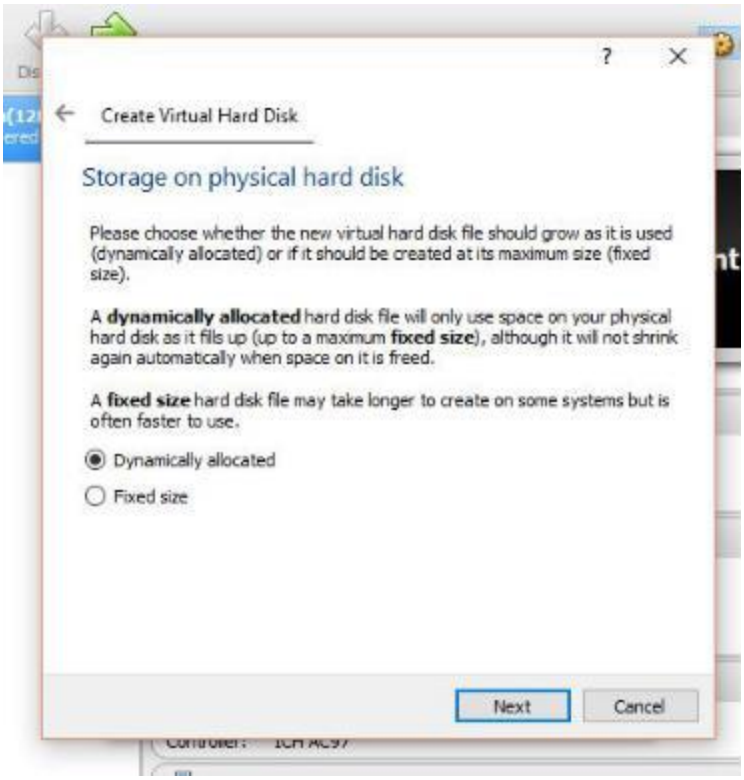
Select the “Create a virtual hard drive now” option: Note: your grayed area may say Empty



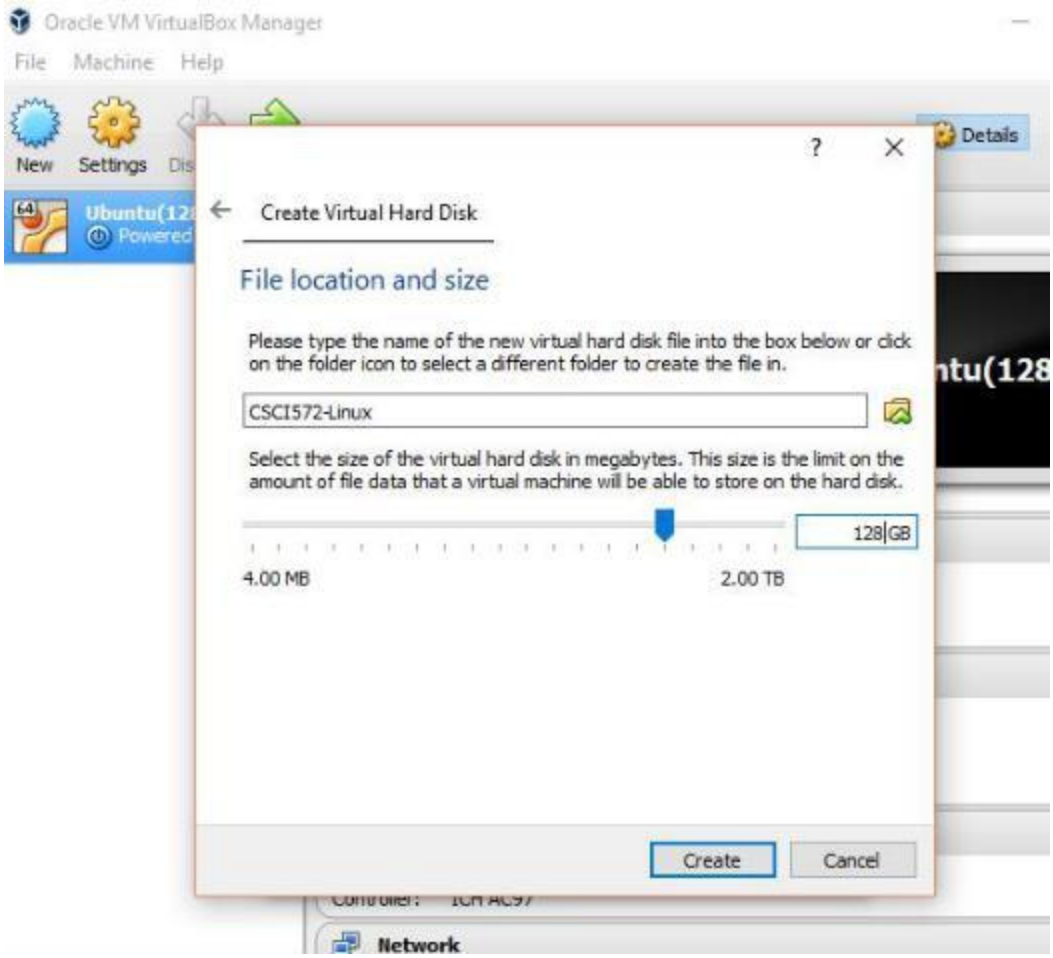
Select the "VDI (VirtualBox Disk Image)" option for Hard disk File Type



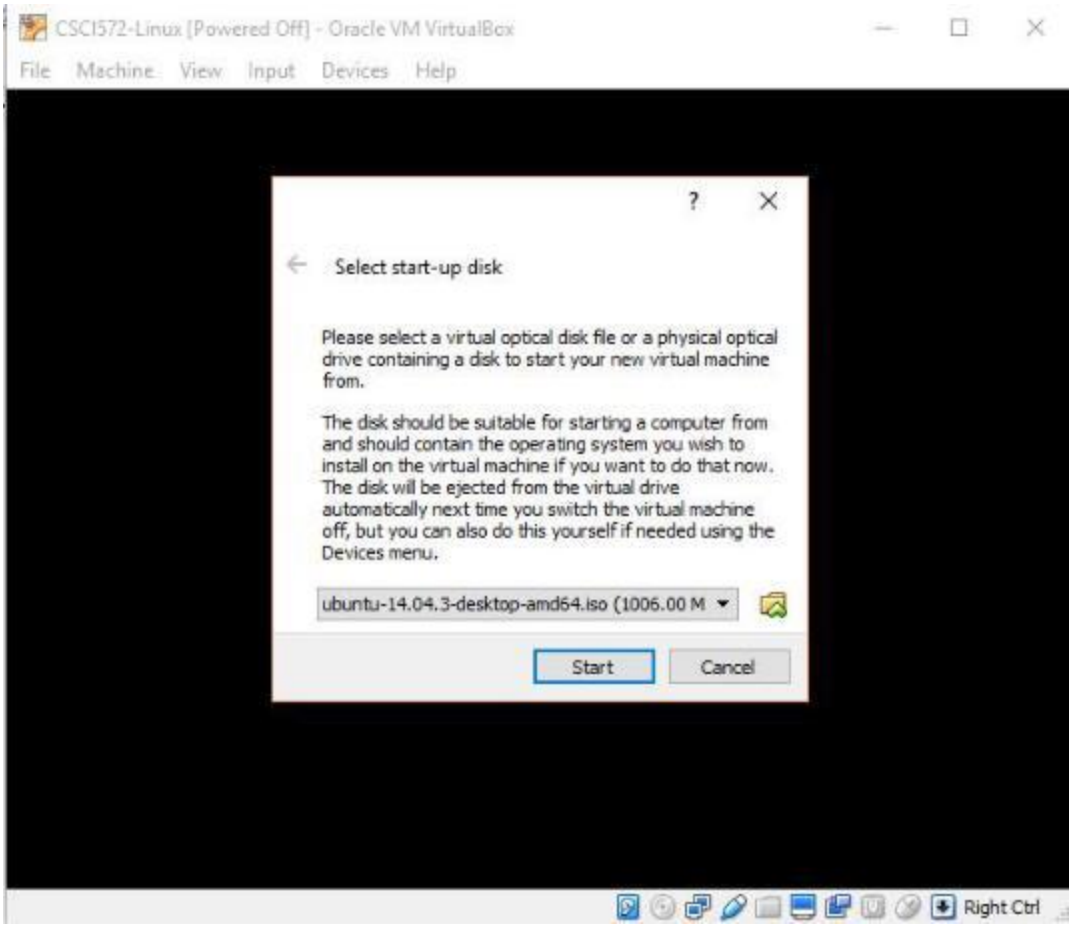
- Select "Dynamically allocated" for Storage on physical hard disk



Select the starting drive size (it is recommended to allot at least 128GB). Note: you may be unable to get exactly 128GB.



9. With your new instance selected, select start from the application ribbon.
10. When prompted, select the previously downloaded Ubuntu iso file as the virtual optical disk file by clicking on the folder icon and click on Start

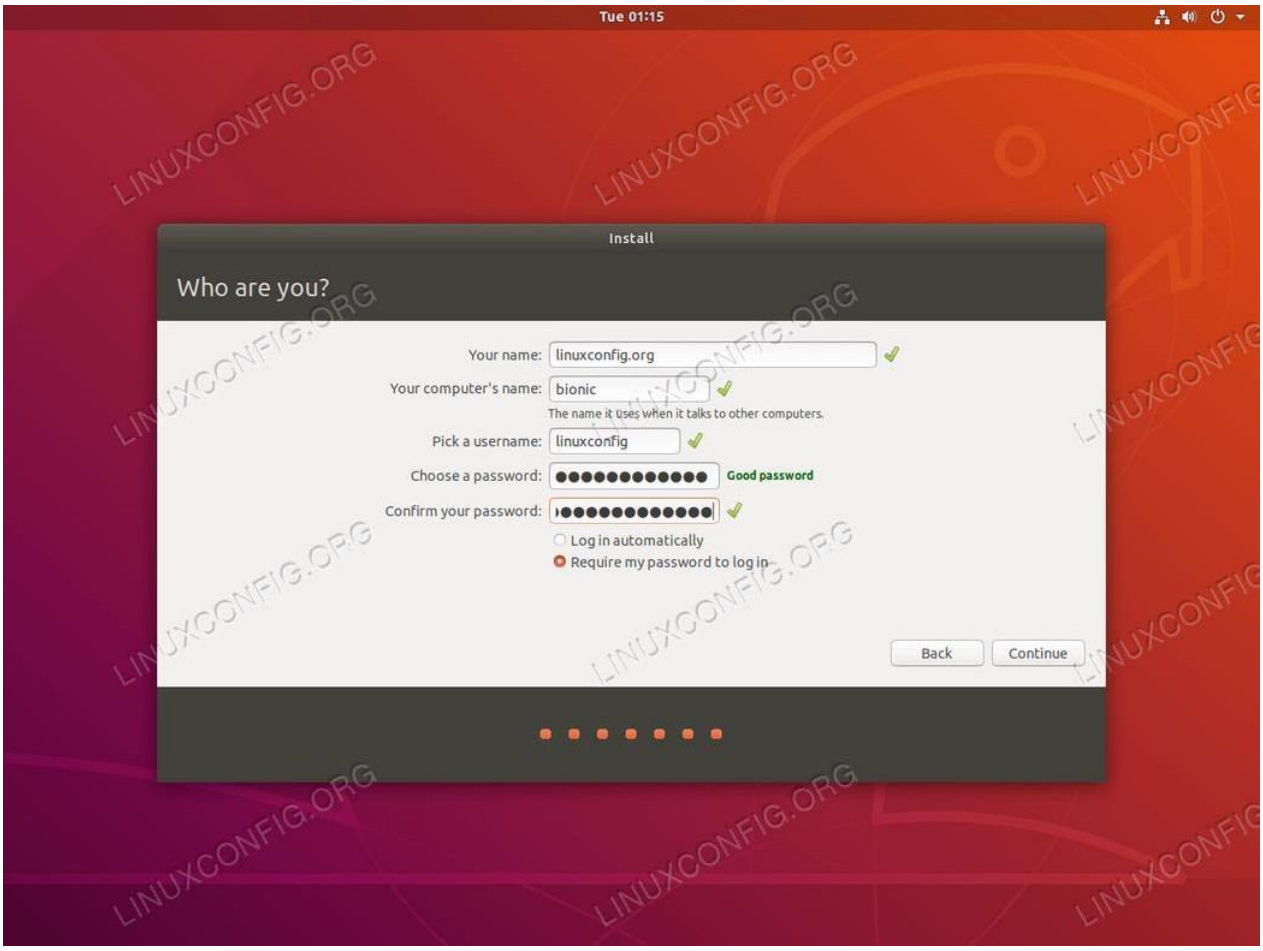


11. Click on Install Ubuntu

Click on Continue and select Erase disk and install Ubuntu and click on Install Now. Messages may appear indicating Auto capture of keyboard and mouse pointer. The messages can be removed

12. Follow the prompts to install Ubuntu. Select Location and Language. Enter your username and

Password for the Ubuntu system. Select either Log in automatically if you want to log in without password when the Ubuntu machine is started from VirtualBox



Ubuntu Installation will begin after you click on Continue. This will take a while, be patient

LAB 01

Linux Commands

1. *ls:-*

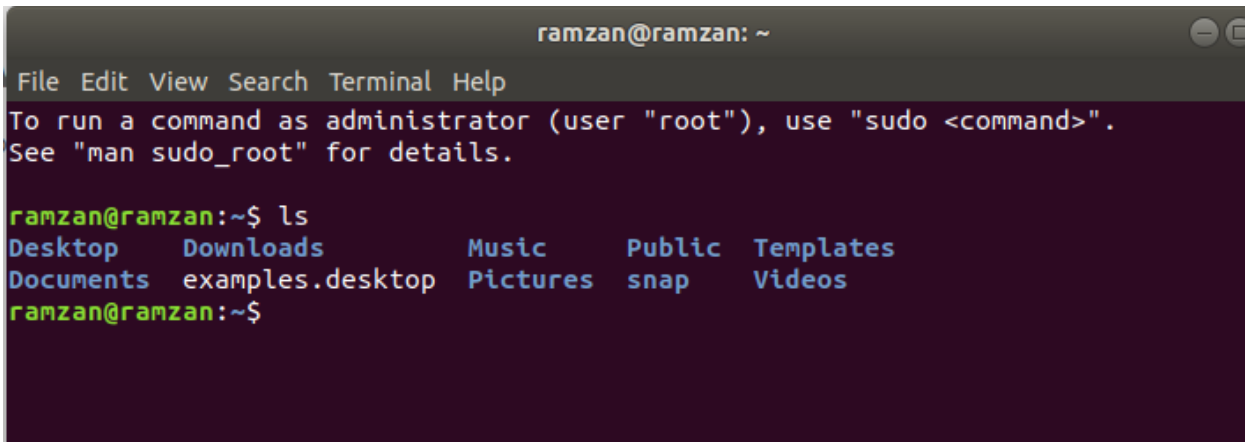
Parameters:-

-a, -all, /

Description:-

Without arguments, lists the files and directories names in the current directory.
$ ls / : Lists the contents of the directory given as an argument.
$ ls –a /home/student : Includes so-called “hidden” files and directories whose names begin with a dot (.).
$ ls [options] [files_or_directories]: Lists the contents of the current directory or a specified directory.
$ ls –all: Lists files and directories with detailed information like permissions, size, owner, etc.

Screenshot:-



2. *date:-*

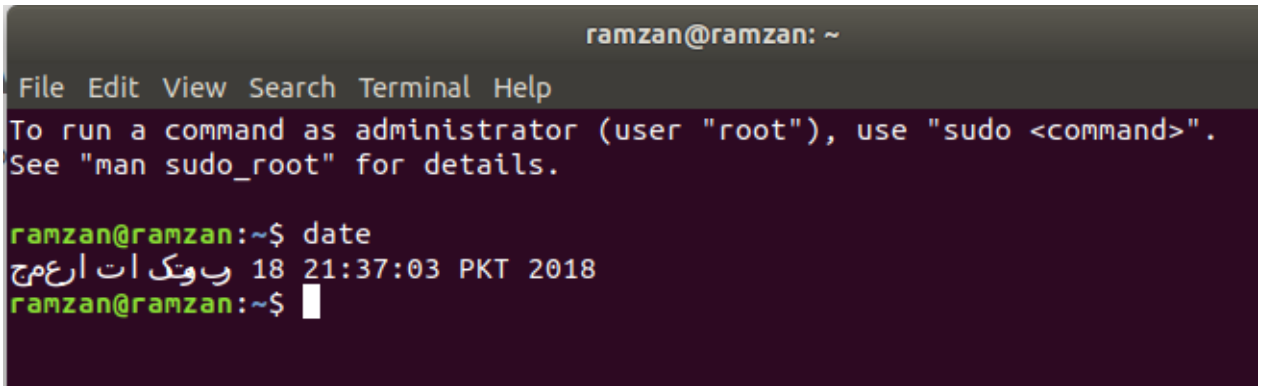
Parameters:-

N.A.

Description:-

Prints the system date and time.

Screenshot:-



3. cal:-

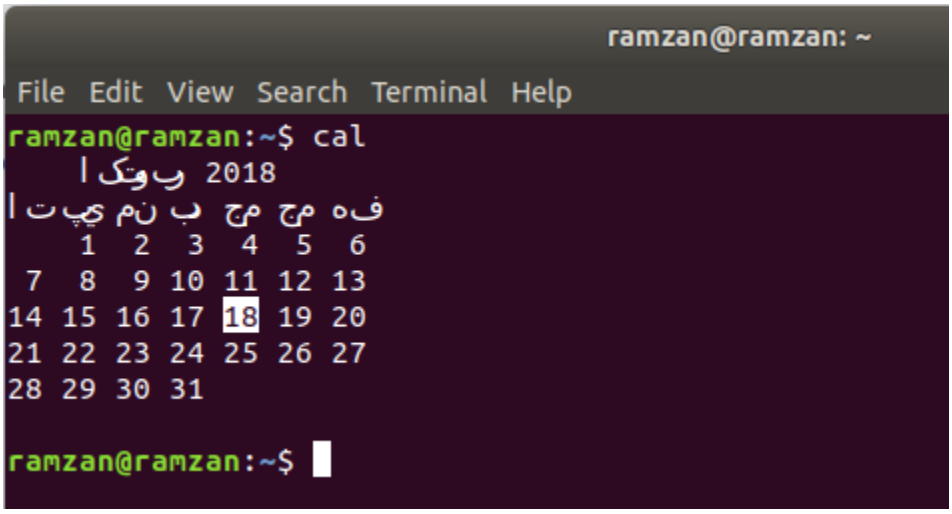
Parameters:-

N.A.

Description:-

Prints the ASCII calendar of the current month.

Screenshot:-



4. pwd:-

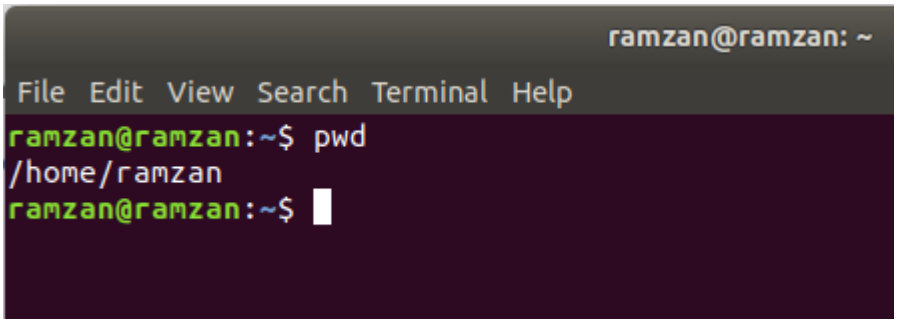
Parameters:-

N.A.

Description:-

Displays the absolute path to the current working directory.

Screenshot:-



5. cd:-

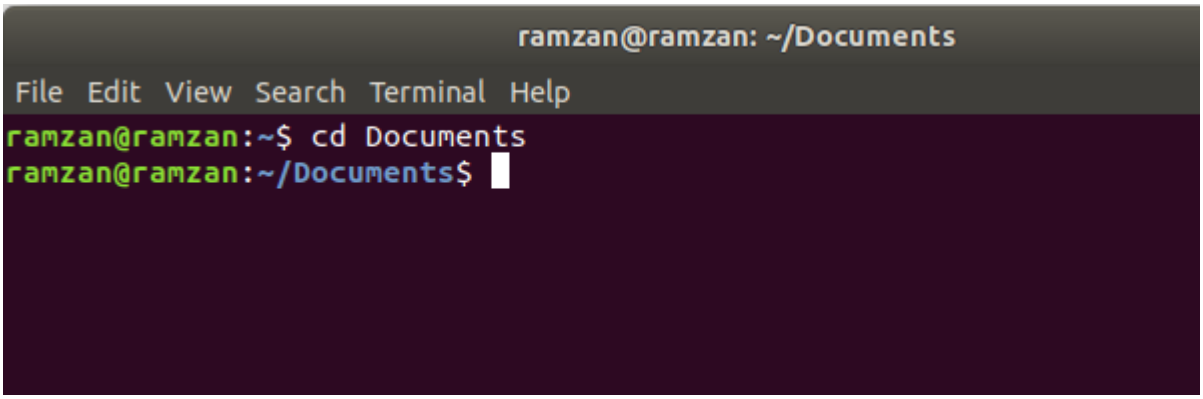
Parameters:-

.., ~, -

Description:-

$ cd: Changes directories.
$ cd /home/uet/cs: To an absolute path.
$ project /docs: To a relative path.
$ cd .. : To a directory one level up.
$ cd ~ : T a directory one level up.
$ cd - : To your previous working directory.

Screenshot:-



6. mkdir:-

Parameters:-

N.A.

Description:-

Directories can be created on a Linux operating system using the following command:-

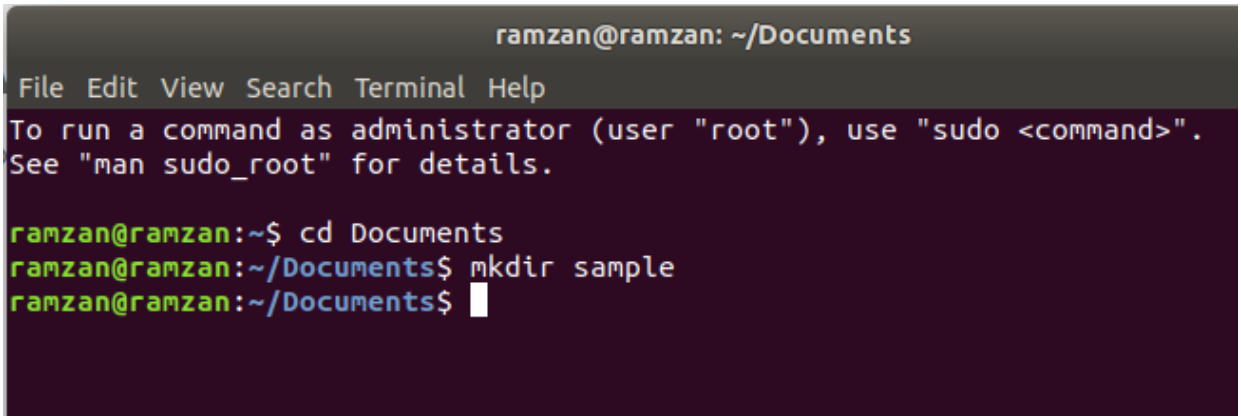
mkdir directoryname

This command will create a subdirectory in your present working directory, which is usually your "Home Directory".

For example,

mkdir mydirectory

Screenshot:-



7. rm:-

Parameters:-

N.A.

Description:-

To remove a file, use the command -

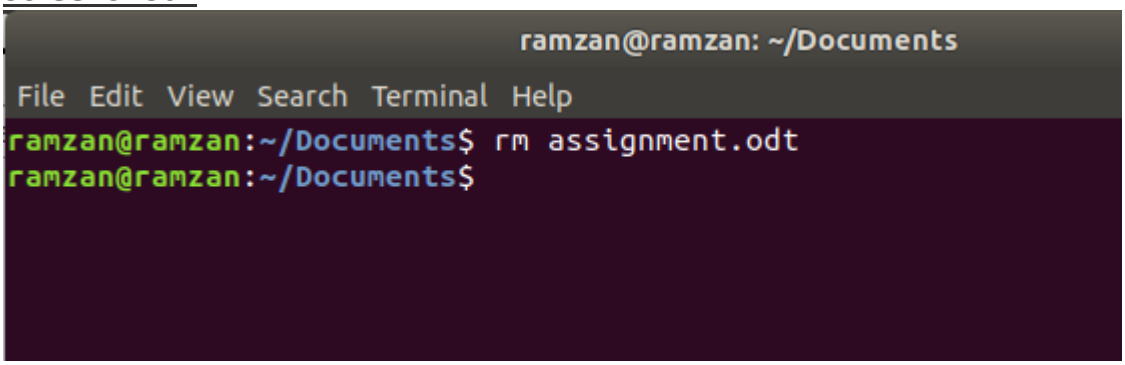
rm filename

Example

Rm assignment.odt

will delete the directory mydirectory

Screenshot:-



8. mv:-

Parameters:-

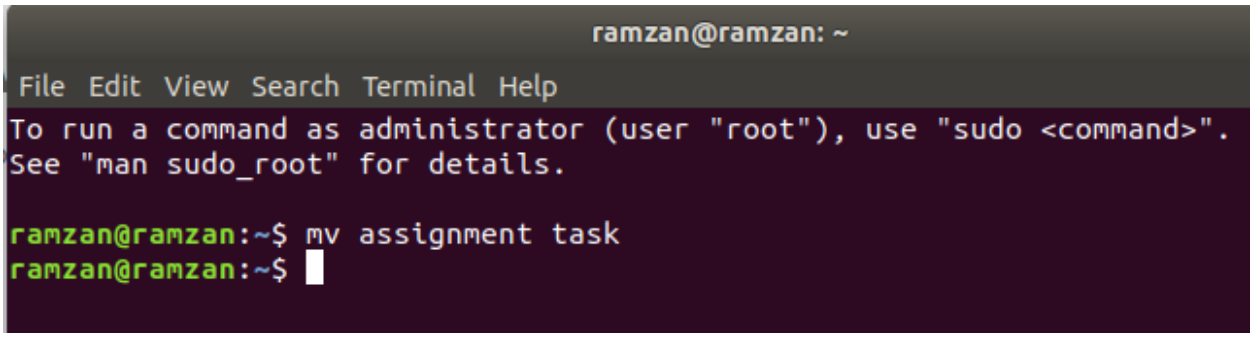
N.A.

Description:-

The 'mv' (move) command can also be used for renaming directories. Use the below-given format:

mv directoryname newdirectoryname

Screenshot:-



9. man:-

Parameters:-

N.A.

Description:-

Man stands for manual which is a reference book of a Linux operating system. It is similar to HELP file found in popular software.

To get help on any command that you do not understand, you can type

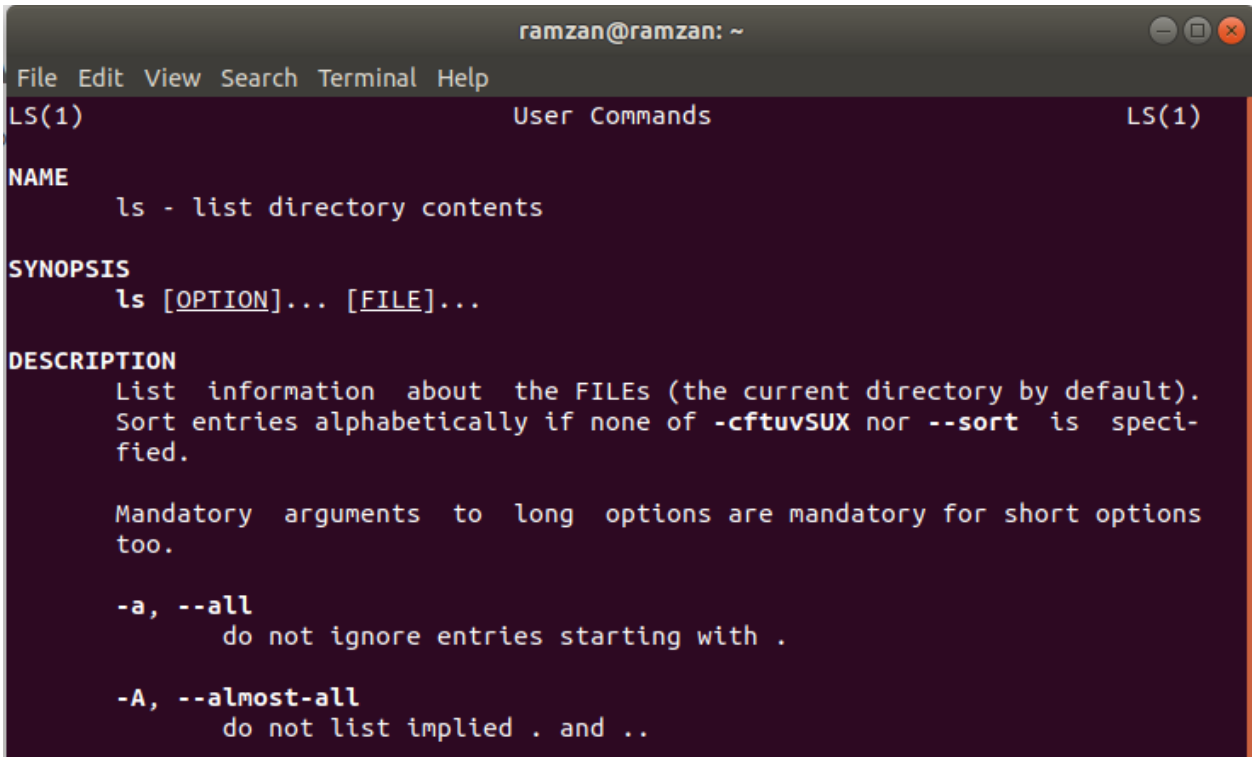
man

The terminal would open the manual page for that command.

For an example, if we type man man and hit enter; terminal would give us information on man command

$ man man

Screenshot:-



10. history:-

Parameters:-

N.A.

Description:-

History command shows all the commands that you have used in the past for the current terminal session. This can help you refer to the old commands you have entered and re-used them in your operations again.

Screenshot:-

```
ramzan@ramzan:~/Documents$ history
    1  clear
    2  find assignment.
    3  assignment.
    4  find assignment.odt
    5  clear
    6  assignment.*
    7  clear
    8  find assignment.*
    9  ls
   10  clear
   11  man
   12  clear
   13  man ls
   14  clear
   15  find assignmnet.odt
   16  clear
   17  find assignment.
   18  clear
   19  find Sample.*
   20  clear
   21  whoami
```

11. clear:-

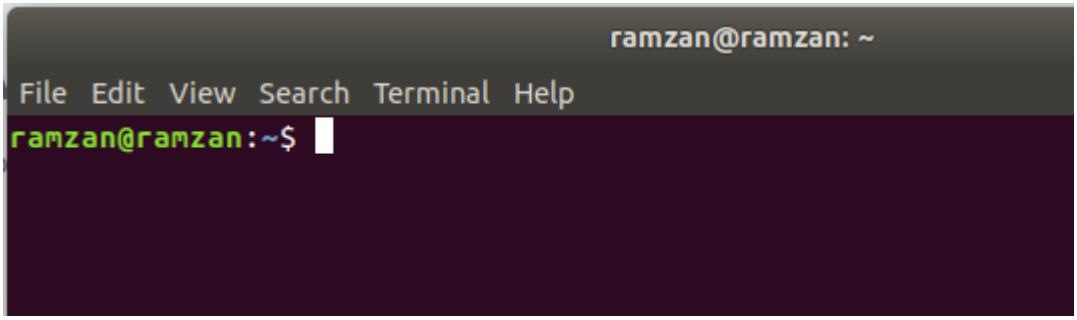
Parameters:-

N.A.

Description:-

This command clears all the clutter on the terminal and gives you a clean window to work on, just like when you launch the terminal.

Screenshot:-



12. df:-

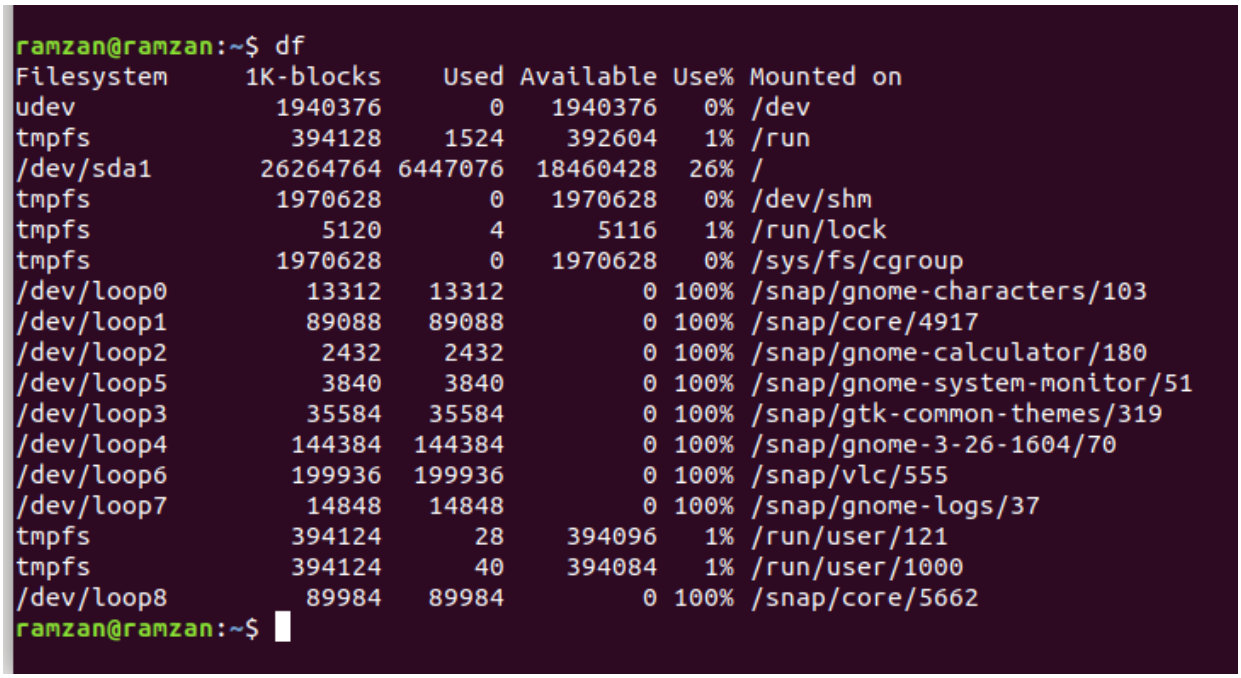
Parameters:-

N.A.

Description:-

Display free disk space.

Screenshot:-



13. echo:-

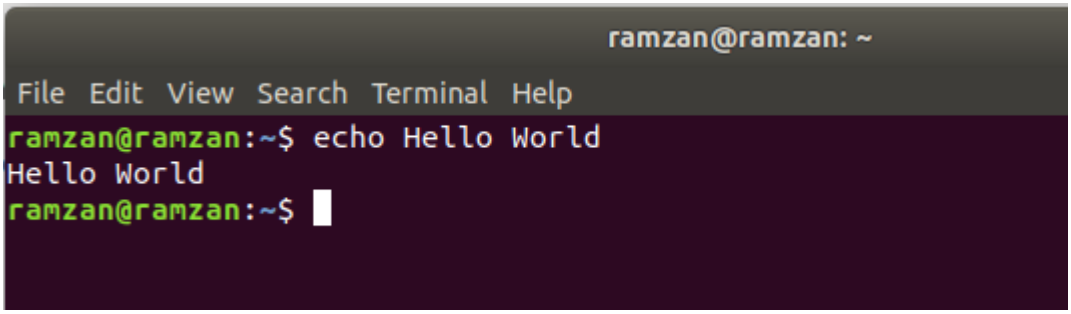
Parameters:-

N.A.

Description:-

Display message on screen.

Screenshot:-



14. free:-

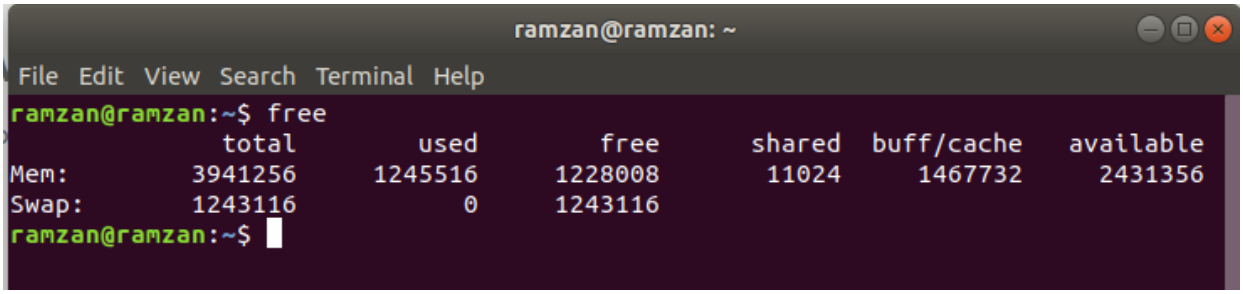
Parameters:-

-h, -m, -g

Description:-

Display memory usage.

Screenshot:-



15. logname:-

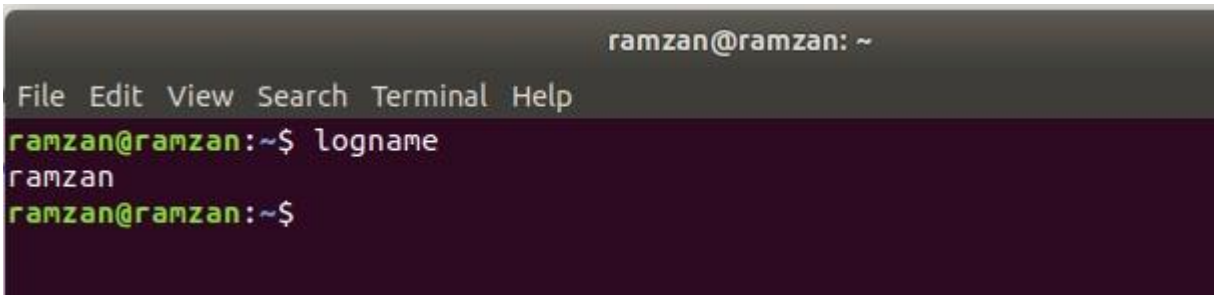
Parameters:-

N.A.

Description:-

Display memory usage.

Screenshot:-



16. whoami:-

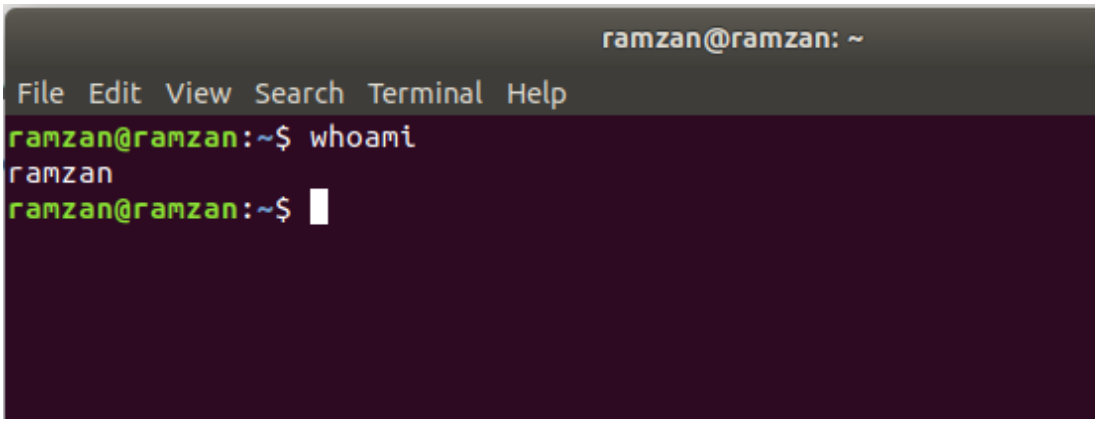
Parameters:-

N.A.

Description:-

Print the current user id and name.

Screenshot:-



17. uname:-

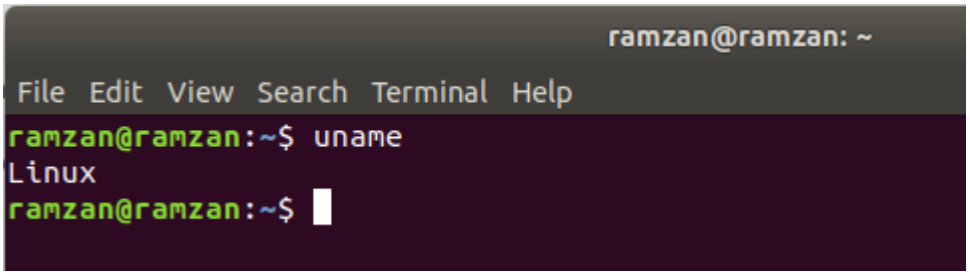
Parameters:-

-a, -r

Description:-

Print system information

Screenshot:-



18. factor:-

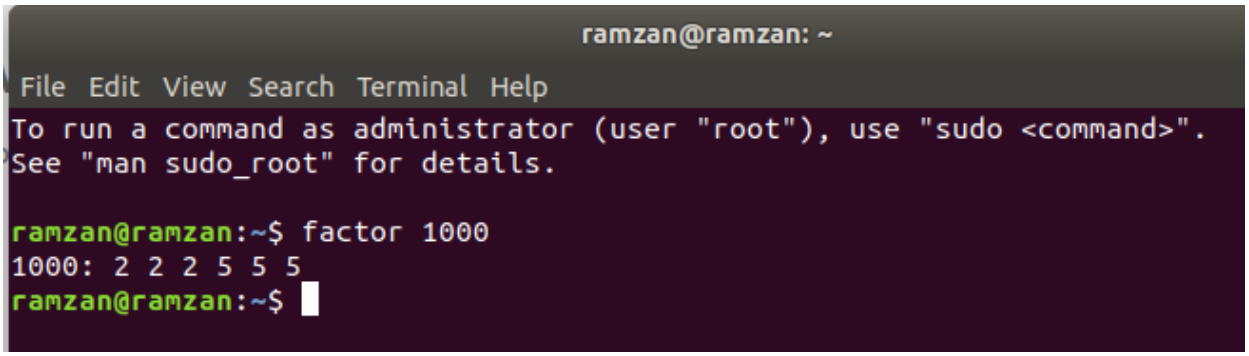
Parameters:-

N.A.

Description:-

Display prime factors of specified integer numbers.

Screenshot:-



19. top:-

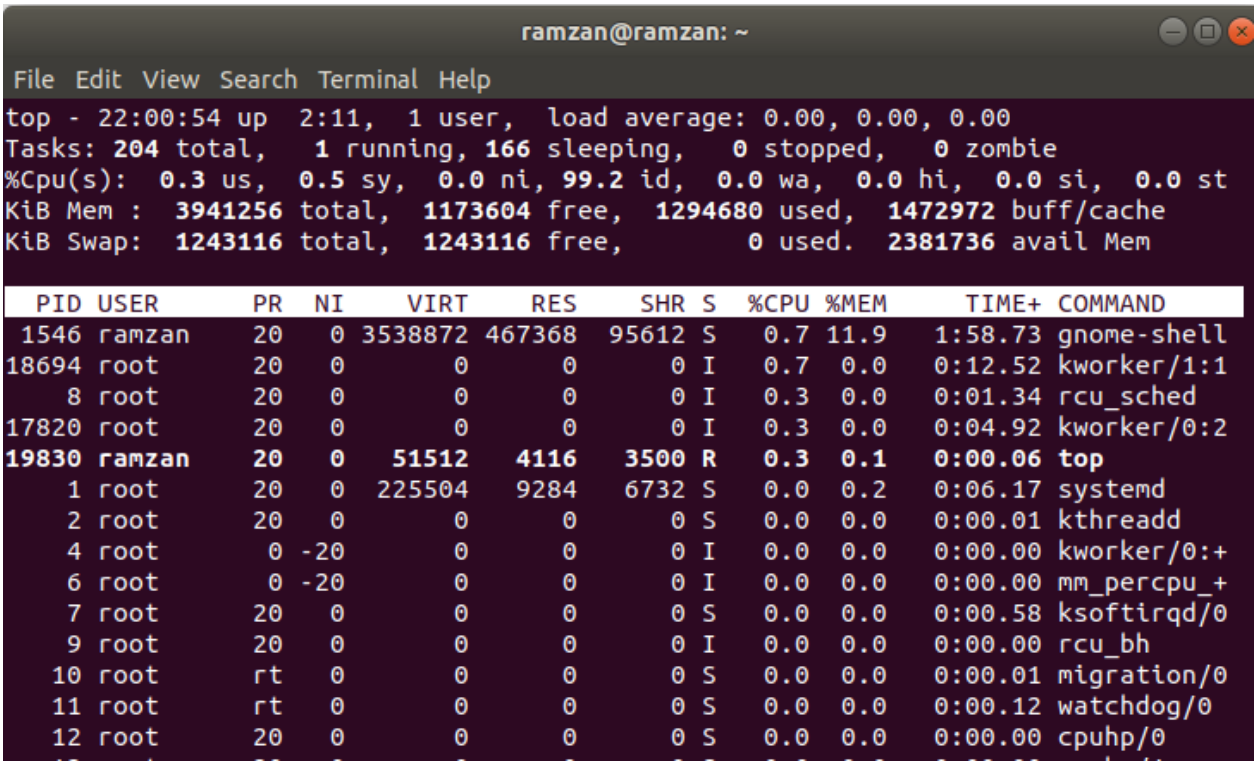
Parameters:-

N.A.

Description:-

Shows top consumers of memory and CPU.

Screenshot:-



20. ps:-

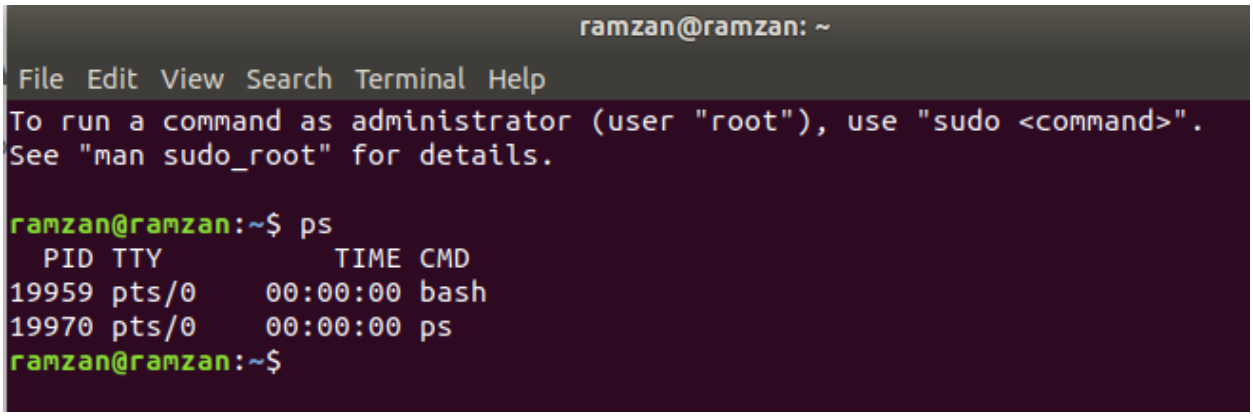
Parameters:-

-ef

Description:-

Shows processes running by user.

Screenshot:-



21. hostname:-

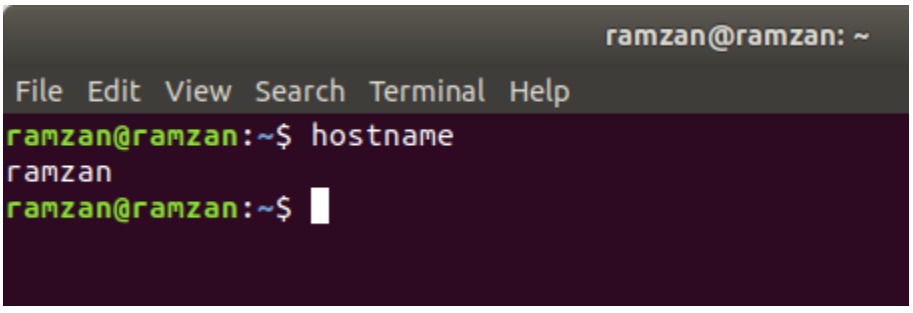
Parameters:-

-I

Description:-

Use hostname to know your name in your host or network. Basically, it displays your hostname and IP address. Just typing “hostname” gives the output. Typing in “hostname -I” gives you your IP address in your network.

Screenshot:-



22. arch:-

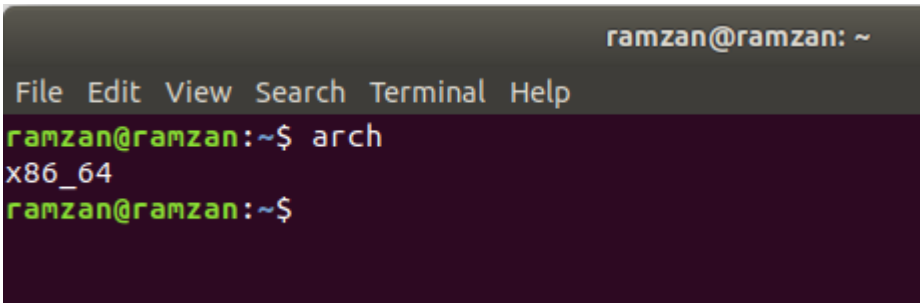
Parameters:-

N.A.

Description:-

The arch command is used to print the machine's architecture.

Screenshot:-



23. uptime:-

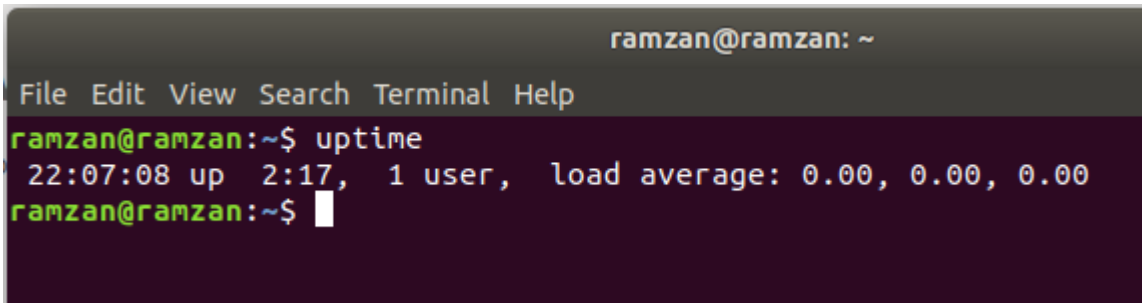
Parameters:-

N.A.

Description:-

Shows how long the system has been running + load.

Screenshot:-



24. cat:-

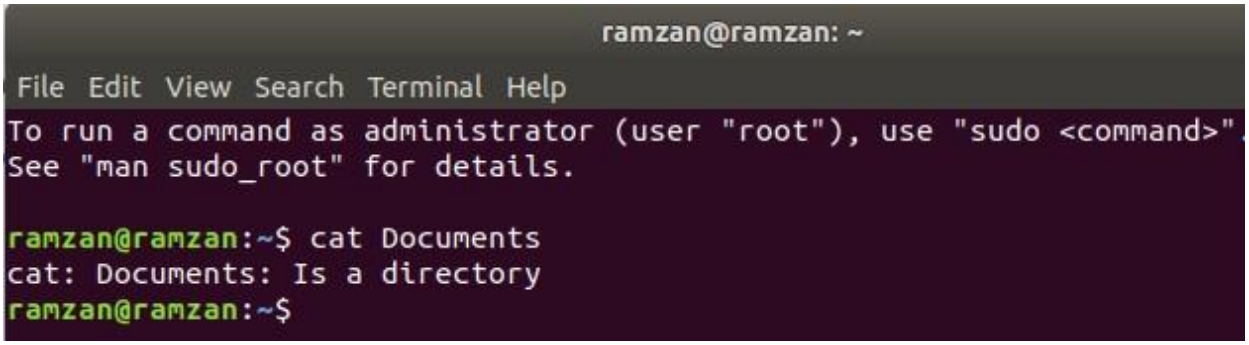
Parameters:-

N.A.

Description:-

View the contents of file.

Screenshot:-



25. tty:-

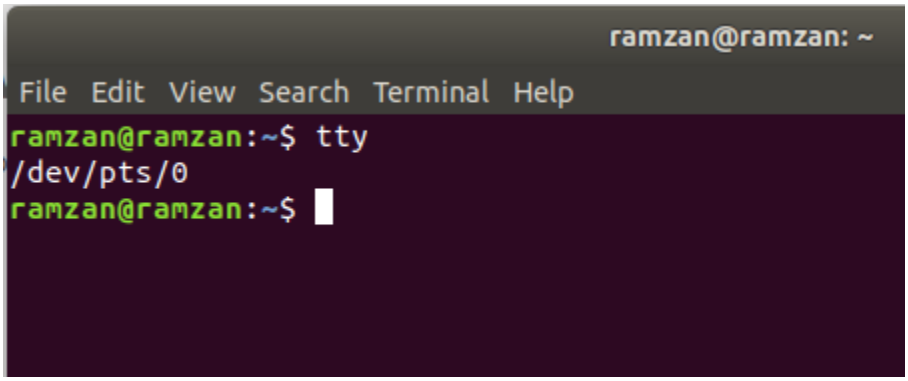
Parameters:-

N.A.

Description:-

Displays current terminal.

Screenshot:-



26. touch:-

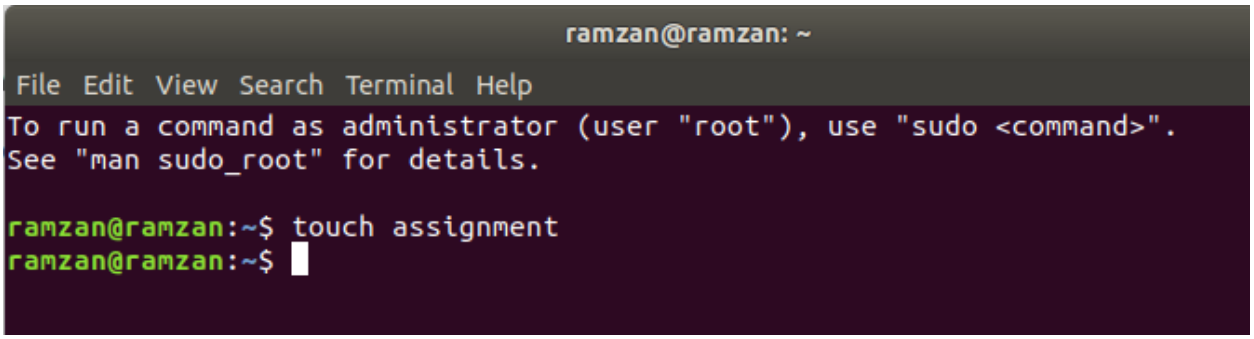
Parameters:-

N.A.

Description:-

Create an empty file.

Screenshot:-



27. find:-

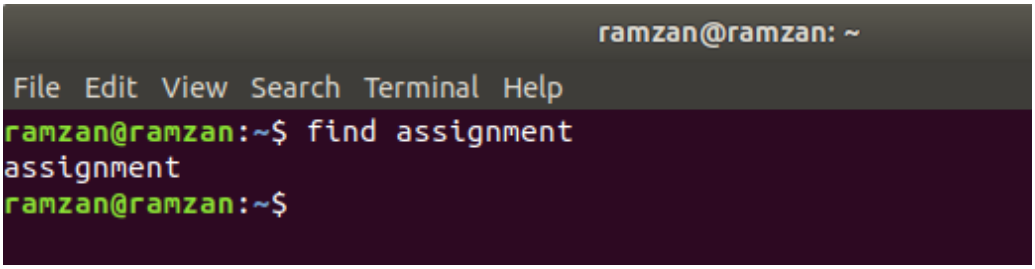
Parameters:-

-name, -iname

Description:-

To find a file by name.

Screenshot:-



28. cp:-

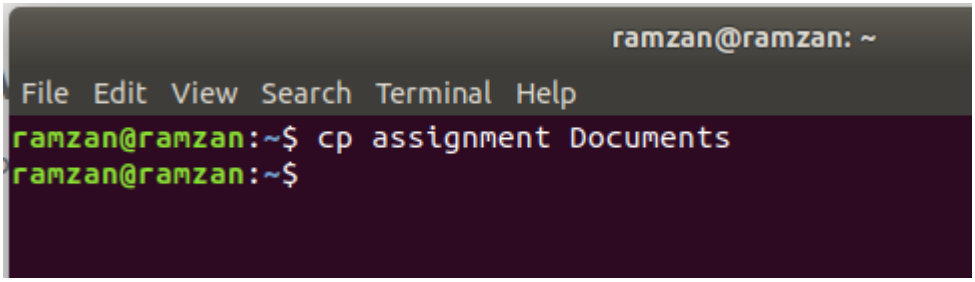
Parameters:-

-a, -f, -i

Description:-

To copy a file.

Screenshot:-



29. dir:-

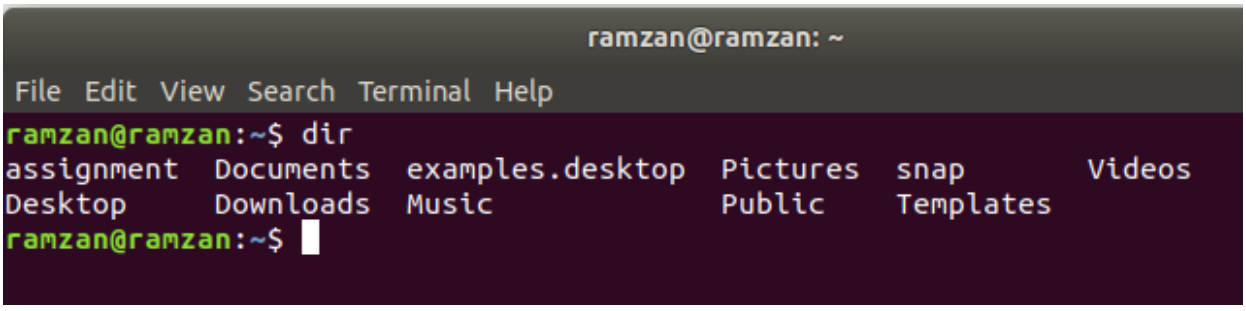
Parameters:-

-a, -all, -l

Description:-

To get a list of all the files and folders in the current directory, use the dir command.

Screenshot:-



30. info:-

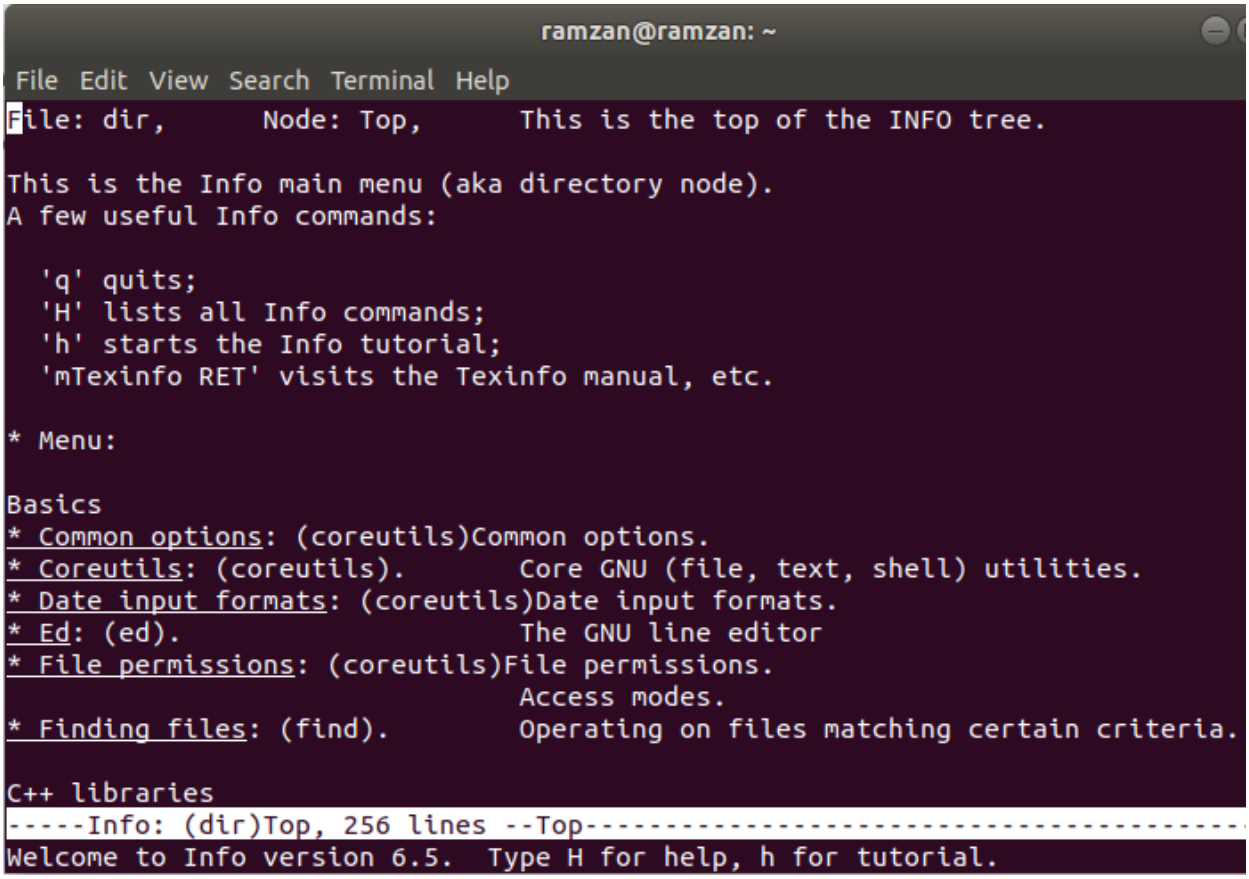
Parameters:-

N.A.

Description:-

Info gives more details about a specific command than by using the man command.

Screenshot:-



31. nano:-

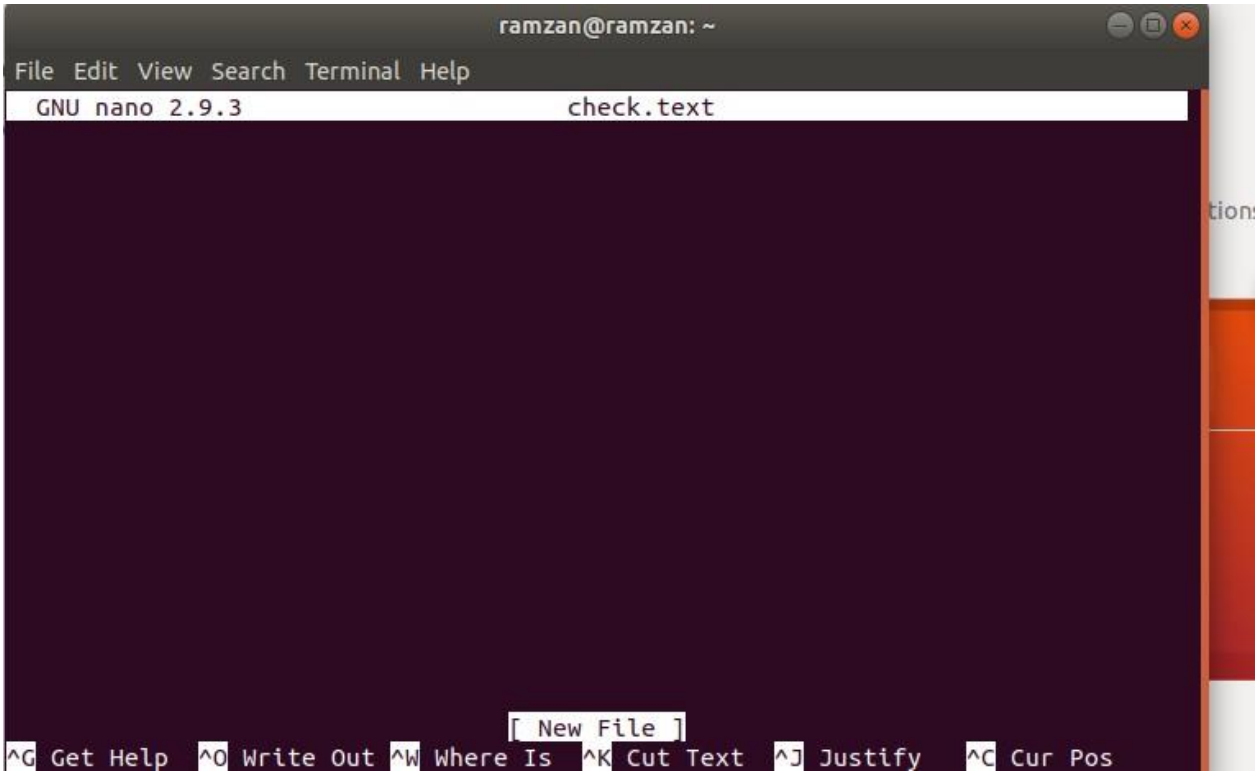
Parameters:-

N.A.

Description:-

nano is already installed text editor in the linux command line. The nano command is a good test editor that denotes keywords with color and can recognize most languages. You can create a new or modify a file using this editor. For example if you need to make a new file named "check.txt", you can create it by using the command "nano check.txt". You can save your files after editing by using the sequence Ctrl + X, then Y (or N for no).

Screenshot:-



32. bzip2:-

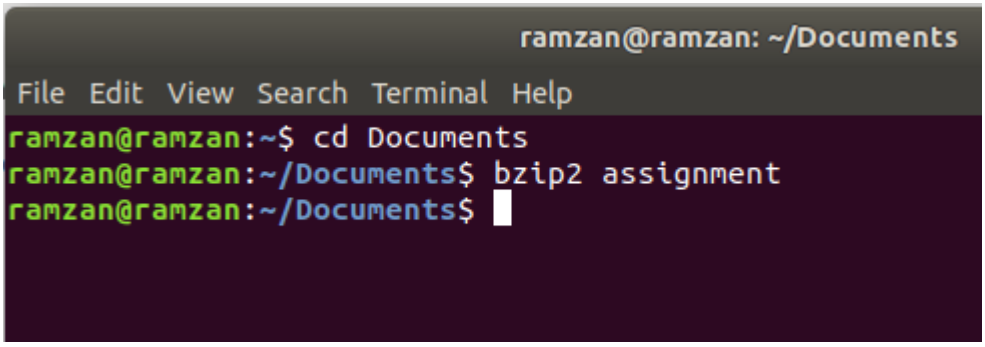
Parameters:-

N.A.

Description:-

A portable, fast, open source program that compresses and decompresses files at a high rate, but that does not archive them.

Screenshot:-



33. service:-

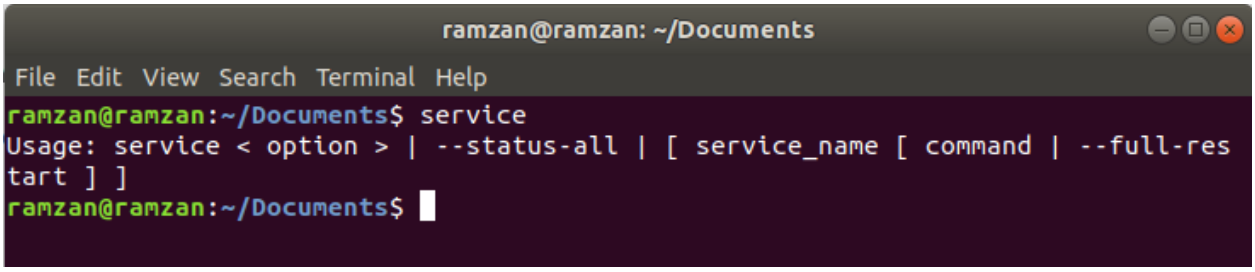
Parameters:-

N.A.

Description:-

This command is the quickest way to start or stop a service, such as networking.

Screenshot:-



34. vi:-

Parameters:-

N.A.

Description:-

The vi environment is a text editor that allows a user to control the system with just the keyboard instead of both mouse selections and keystrokes.

Screenshot:-

35. vmstat:-

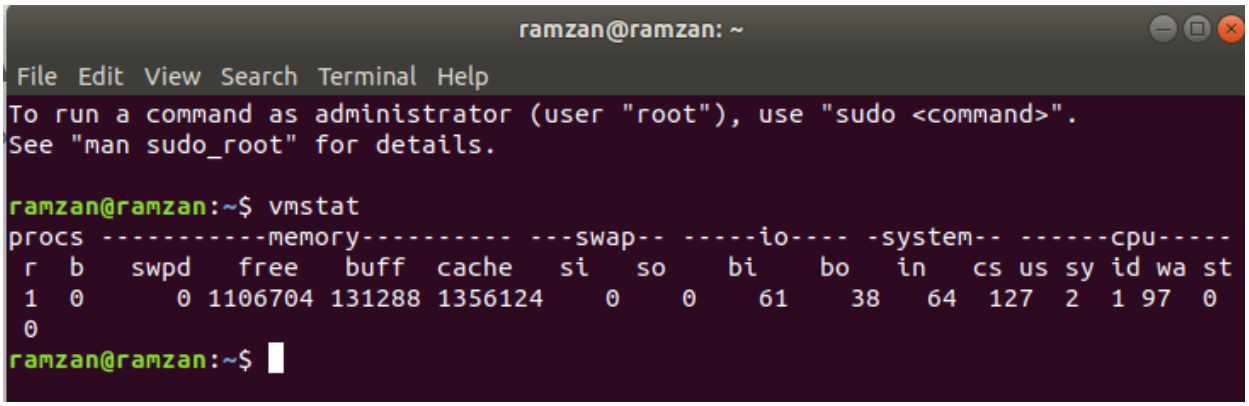
Parameters:-

N.A.

Description:-

The vmstat command snapshots everything in a system and reports information on such items as processes, memory, paging and CPU activity. This is a good method for admins to use to determine where issues/slowdown may occur in a system.

Screenshot:-



36. ssh:-

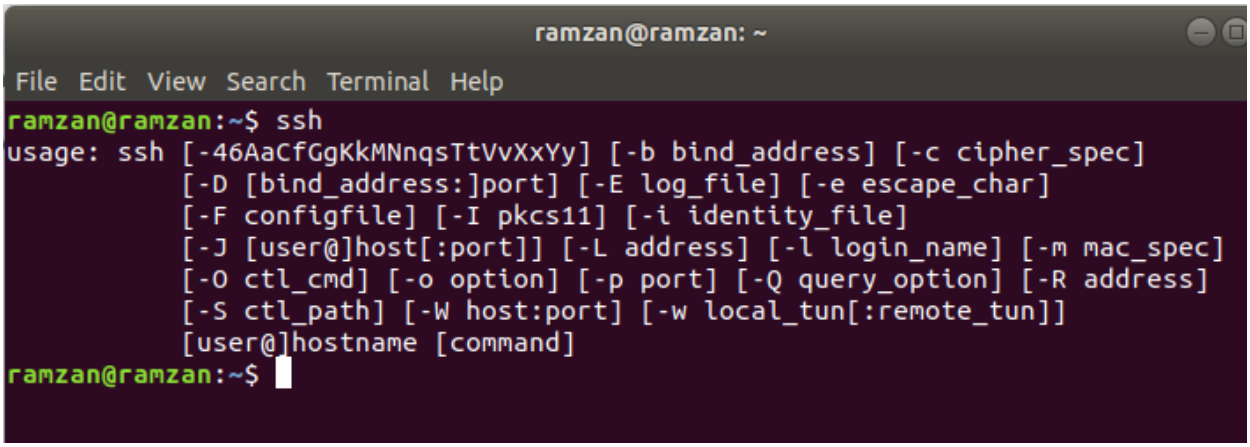
Parameters:-

N.A.

Description:-

SSH is a command interface for secure remote computer access and is used by network admins to remotely control servers.

Screenshot:-



37. exit:-

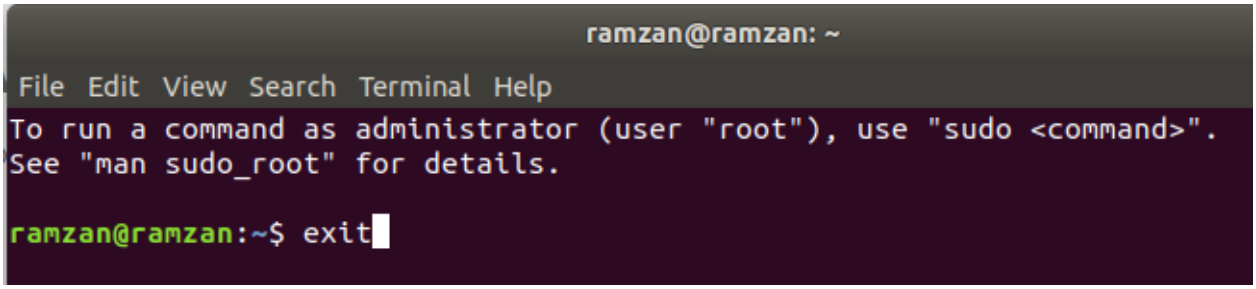
Parameters:-

N.A.

Description:-

exit command is used to exit a shell like so.

Screenshot:-



38. expr:-

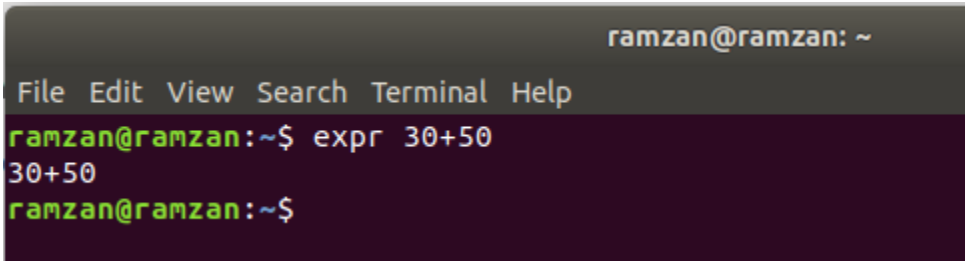
Parameters:-

N.A.

Description:-

expr command is used calculate an expression.

Screenshot:-



39. kmod:-

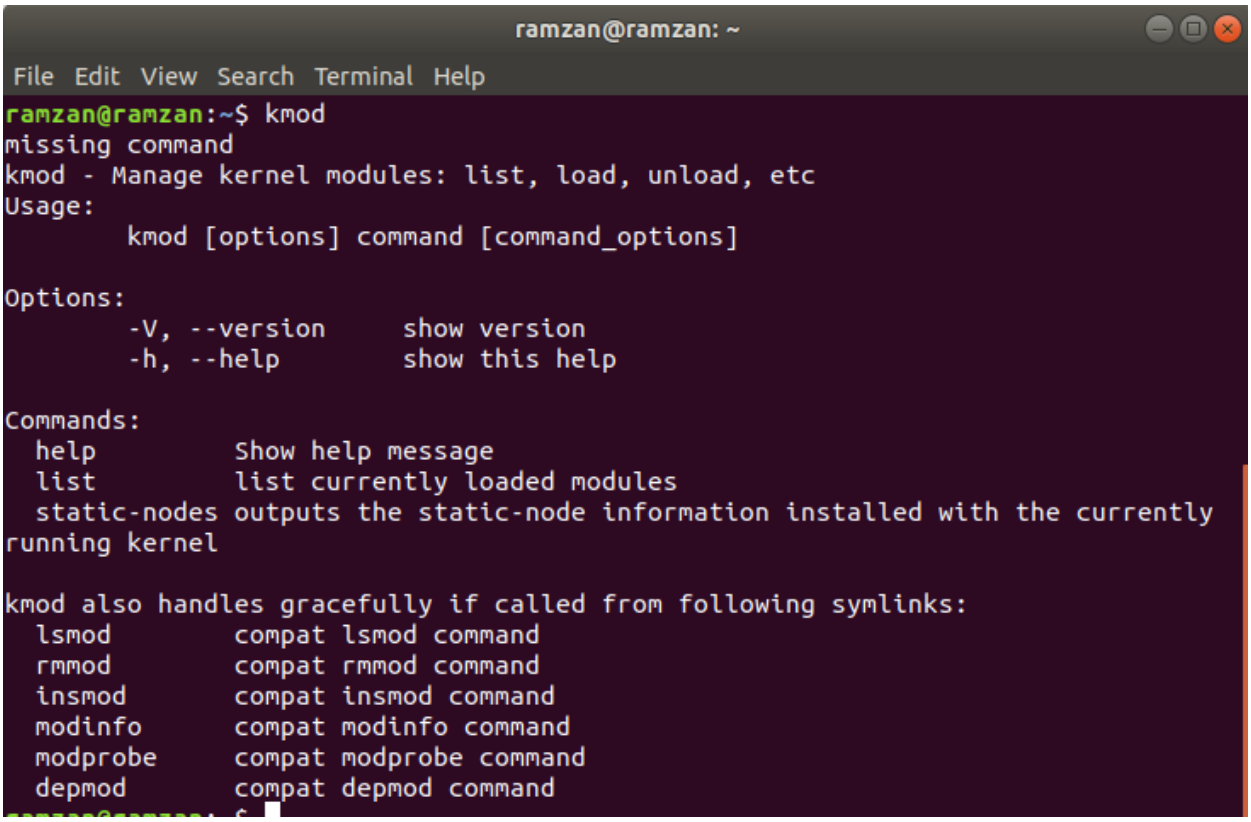
Parameters:-

N.A.

Description:-

kmod command is used to manage linux kernel modules and list all currently loaded modules.

Screenshot:-



40. lscpu:-

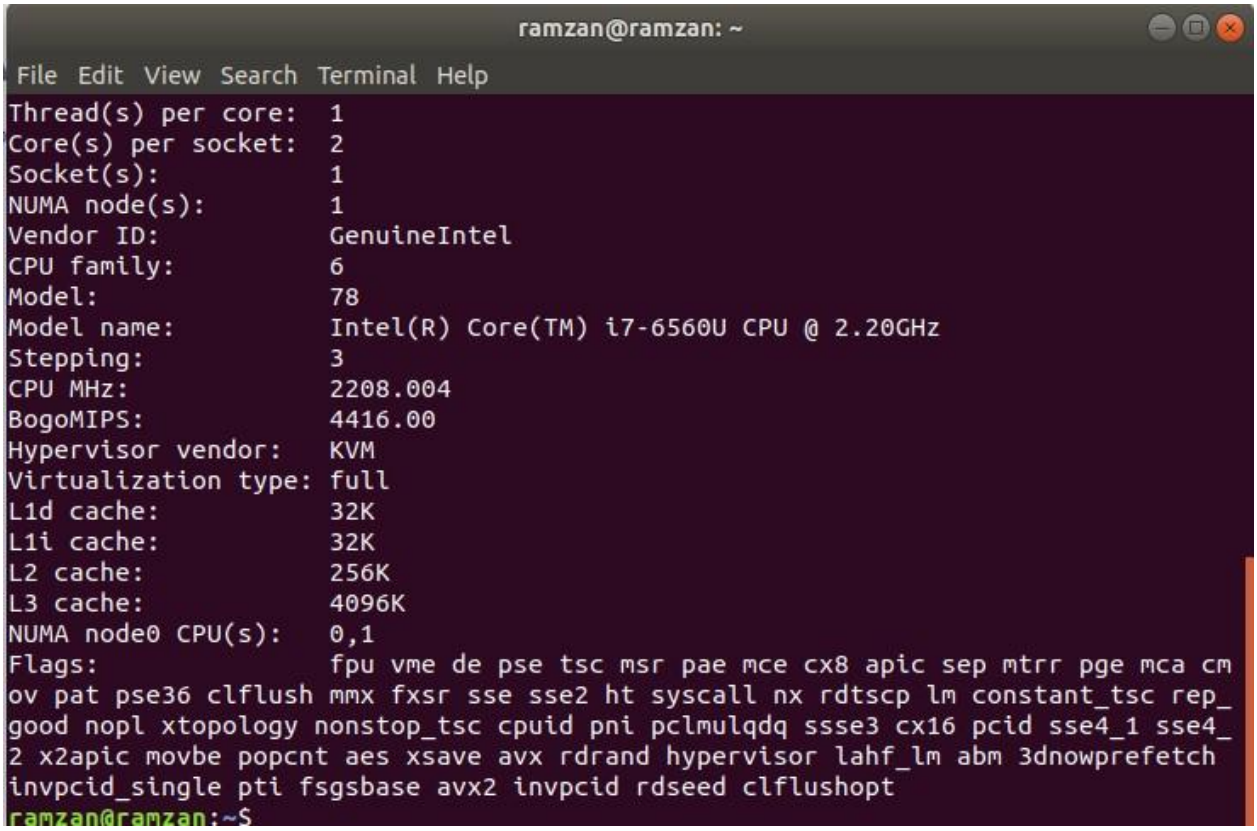
Parameters:-

N.A.

Description:-

lscpu command displays system's CPU architecture information (such as number of CPUs, threads, cores, sockets, and more).

Screenshot:-



41. nproc:-

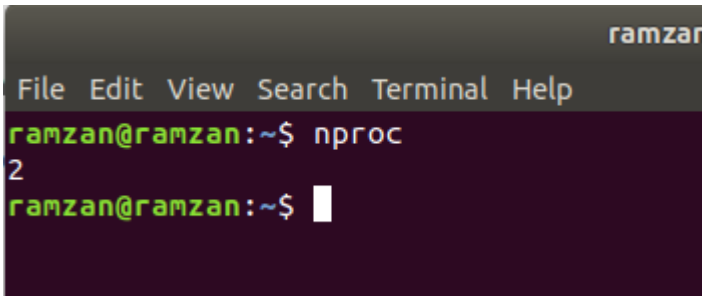
Parameters:-

N.A.

Description:-

nproc command shows the number of processing units present to the current process. It's output may be less than the number of online processors on a system

Screenshot:-



42. stat:-

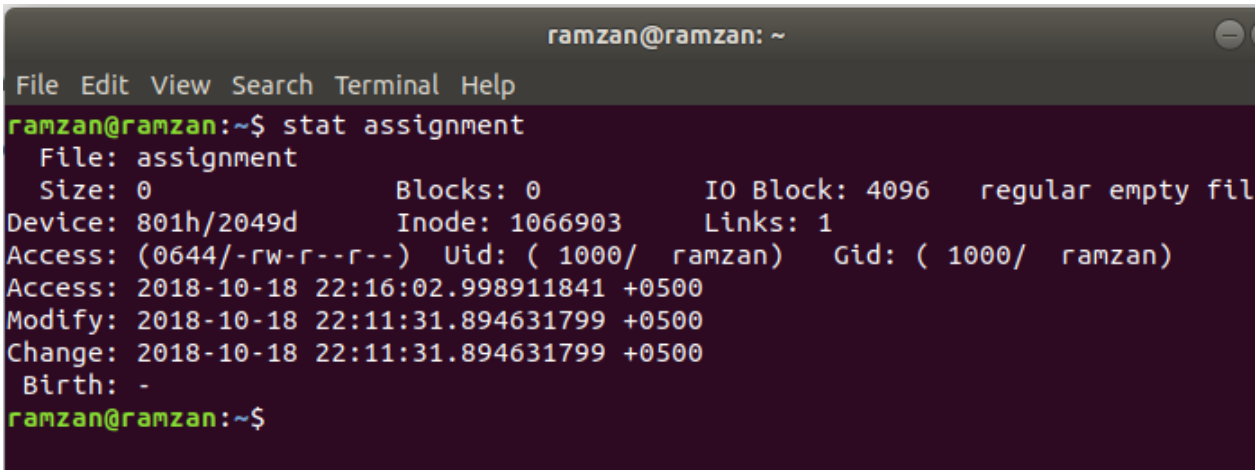
Parameters:-

N.A.

Description:-

stat command is used to show the statistics of a file.

Screenshot:-



43. w:-

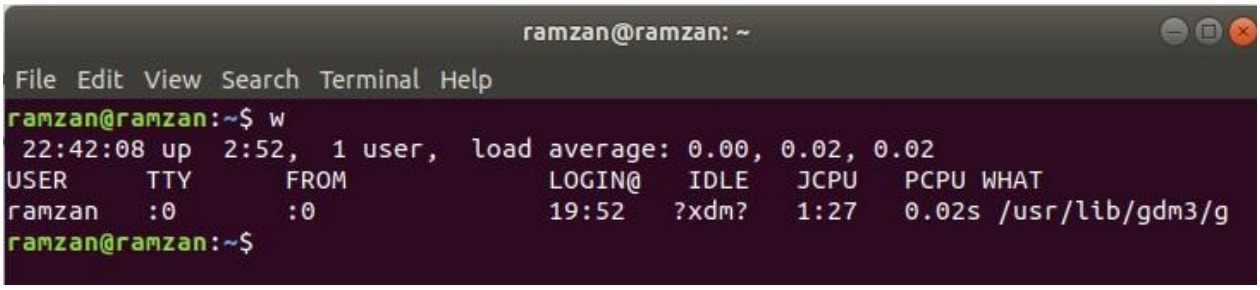
Parameters:-

N.A.

Description:-

w command displays system uptime, load averages and information about the users currently on the machine, and what they are doing (their processes).

Screenshot:-



44. wc:-

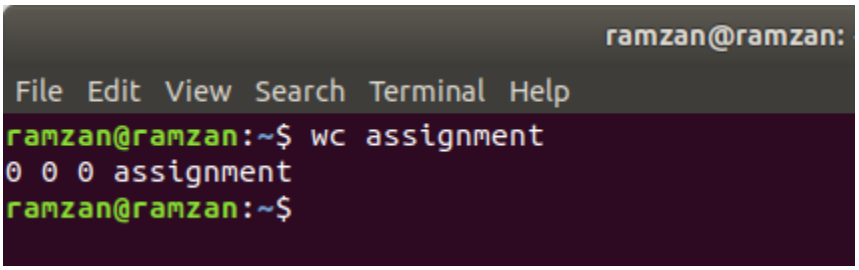
Parameters:-

N.A.

Description:-

wc command is used to display newline, word, and byte counts for each file specified, and a total for many files.

Screenshot:-



45. yes:-

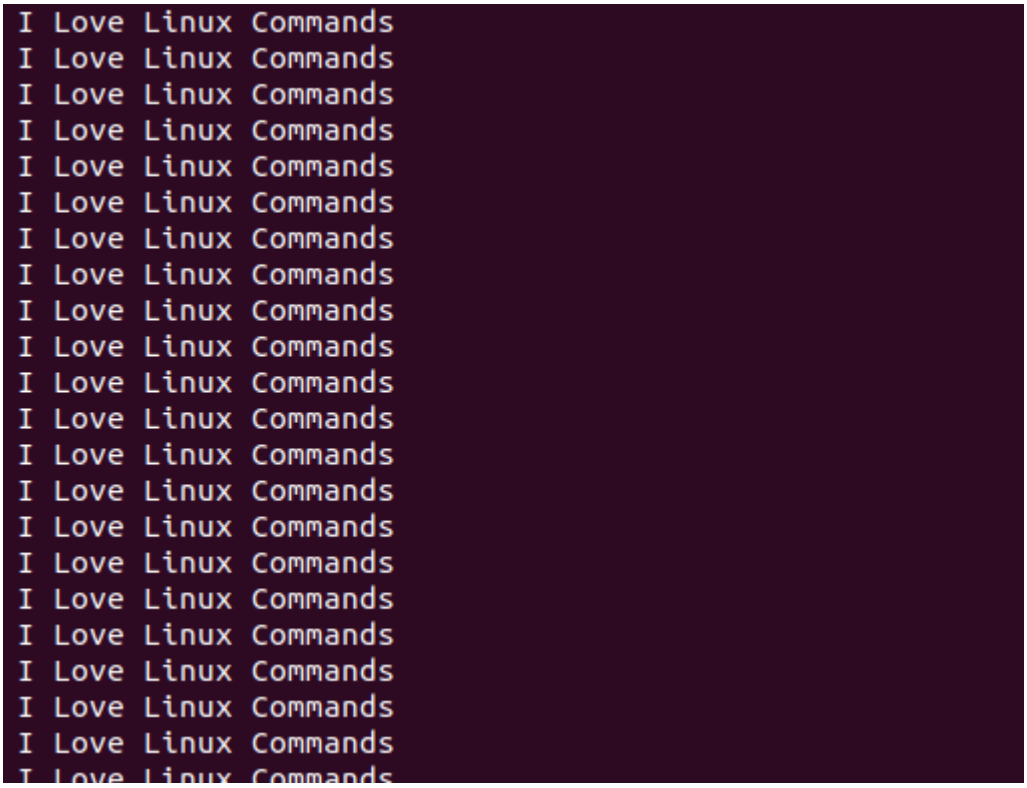
Parameters:-

N.A.

Description:-

yes command is used to display a string repeatedly until when terminated or killed using Ctrl + C.

Screenshot:-



46. du:-

Parameters:-

-h, -s

Description:-

To retrieve more detailed information about which files use the disk space in a directory, you can use the du command

Screenshot:-

```
ramzan@ramzan:~$ du
4       ./.config/libreoffice/4/user/backup
12      ./.config/libreoffice/4/user/pack/config
20      ./.config/libreoffice/4/user/pack/database/biblio
28      ./.config/libreoffice/4/user/pack/database
8       ./.config/libreoffice/4/user/pack/autotext
16      ./.config/libreoffice/4/user/pack/basic/Standard
28      ./.config/libreoffice/4/user/pack/basic
92      ./.config/libreoffice/4/user/pack
4       ./.config/libreoffice/4/user/config/soffice.cfg/modules/swriter/popupmenu
4       ./.config/libreoffice/4/user/config/soffice.cfg/modules/swriter/statusbar
4       ./.config/libreoffice/4/user/config/soffice.cfg/modules/swriter/images/Bi
tmaps
8       ./.config/libreoffice/4/user/config/soffice.cfg/modules/swriter/images
4       ./.config/libreoffice/4/user/config/soffice.cfg/modules/swriter/toolbar
4       ./.config/libreoffice/4/user/config/soffice.cfg/modules/swriter/menubar
28      ./.config/libreoffice/4/user/config/soffice.cfg/modules/swriter
32      ./.config/libreoffice/4/user/config/soffice.cfg/modules
36      ./.config/libreoffice/4/user/config/soffice.cfg
80      ./.config/libreoffice/4/user/config
4       ./.config/libreoffice/4/user/autocorr
1016    ./.config/libreoffice/4/user/database/biblio
1024    ./.config/libreoffice/4/user/database
```

47. pmap:-

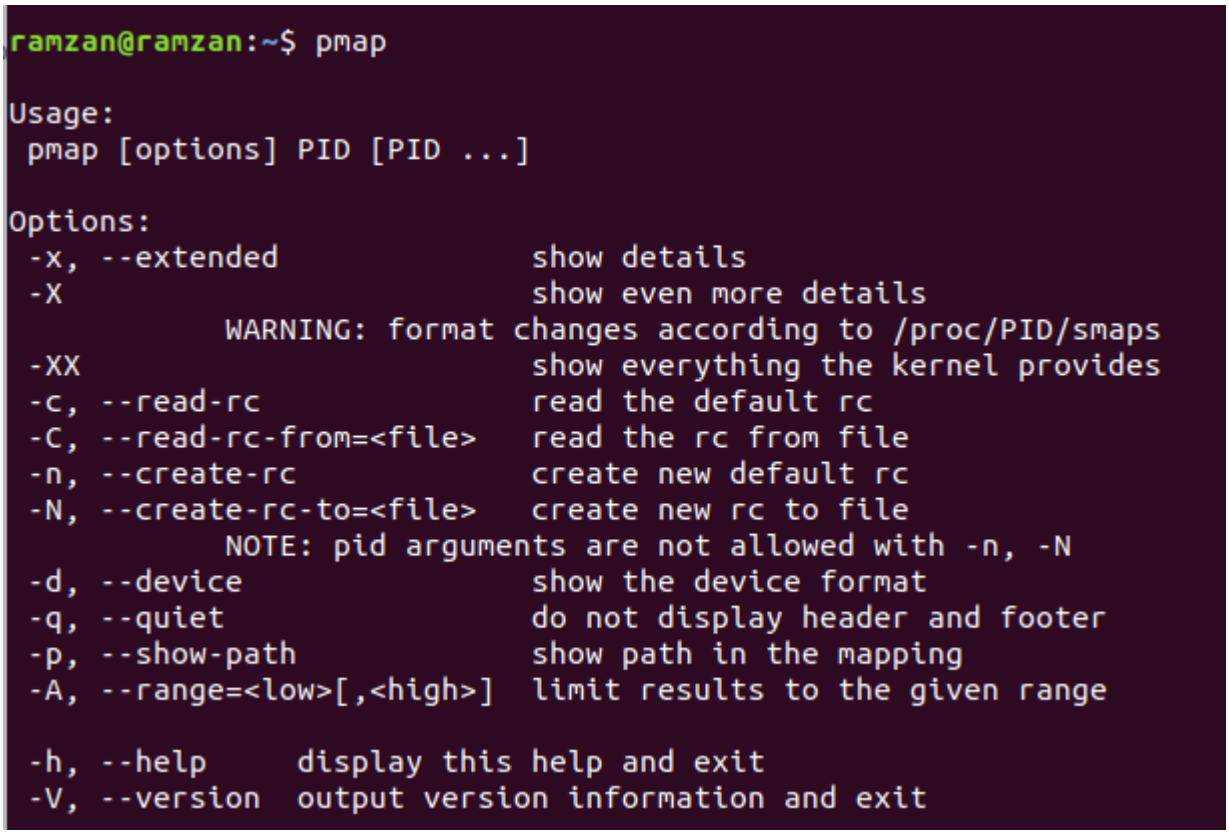
Parameters:-

N.A.

Description:-

Display Memory map of process.

Screenshot:-



48. **shutdown:-**

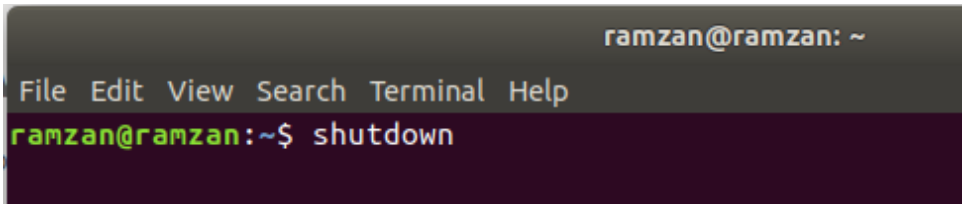
Parameters:-

-h, -r

Description:-

The shutdown command turns off the computer and can be combined with variables such as -h for halt after shutdown or -r for reboot after shutdown.

Screenshot:-



49. reboot:-

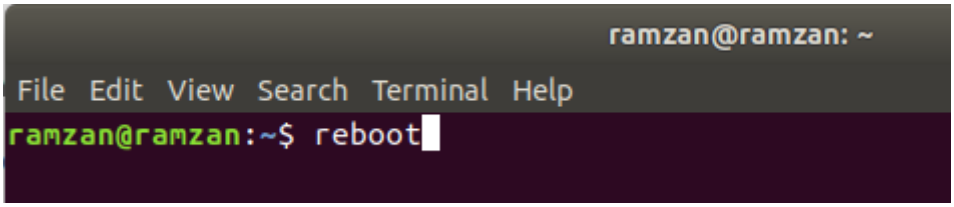
Parameters:-

N.A.

Description:-

Restart the system.

Screenshot:-



50. pstree:-

Parameters:-

N.A.

Description:-

This commands shows all the processes running currently along with associated child process, in a tree like format similar to ‘tree‘ command output.

Screenshot:-


ramzan@ramzan:~$ pstree
systemd─┬─ModemManager───2*[{ModemManager}]
├─NetworkManager─┬─dhclient
└─2*[{NetworkManager}]
├─accounts-daemon───2*[{accounts-daemon}]
├─acpid
├─avahi-daemon───avahi-daemon
├─boltd───2*[{boltd}]
├─colord───2*[{colord}]
├─cron
├─cups-browsed───2*[{cups-browsed}]
├─cupsd
├─dbus-daemon
├─fwupd───4*[{fwupd}]
├─gdm3─┬─gdm-session-wor─┬─gdm-wayland-ses─┬─gnome-session-