Listing files (ls)

If you want to see the list of files on your UNIX or Linux system, use the '**ls**' command.

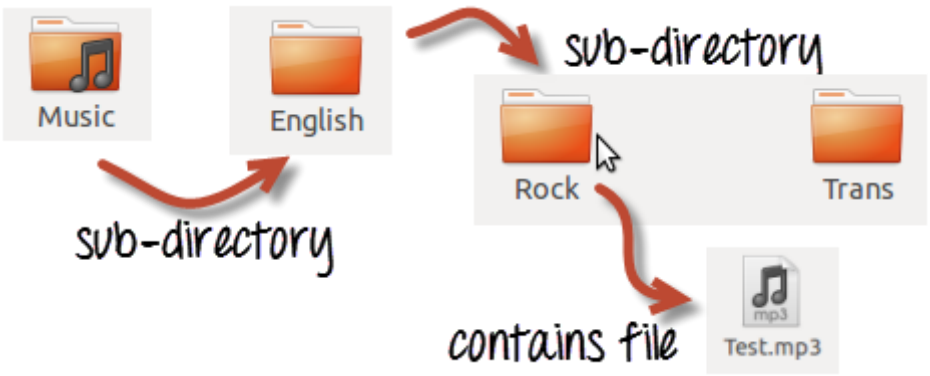
It shows the files /directories in your current directory.

```
guru99@VirtualBox:~$ ls
Desktop     Downloads         Music     Public     Videos
Documents   examples.desktop  Pictures  Templates
guru99@VirtualBox:~$
```

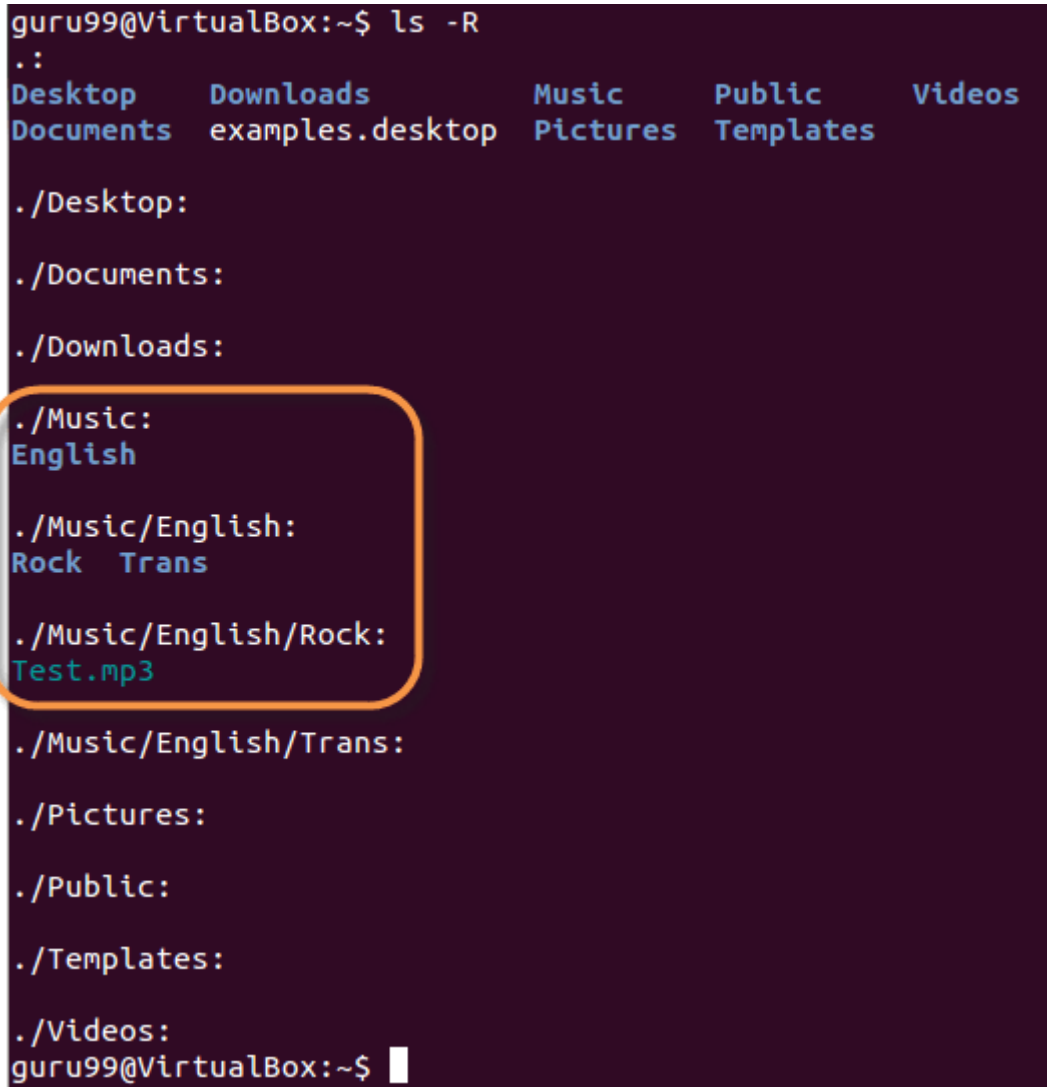
Note:

- Directories are denoted in blue color.
- Files are denoted in white.
- You will find similar color schemes in different flavors of Linux.

Suppose, your "Music" folder has following sub-directories and files.



You can use **'ls -R' to shows all the files not only in directories but also subdirectories**



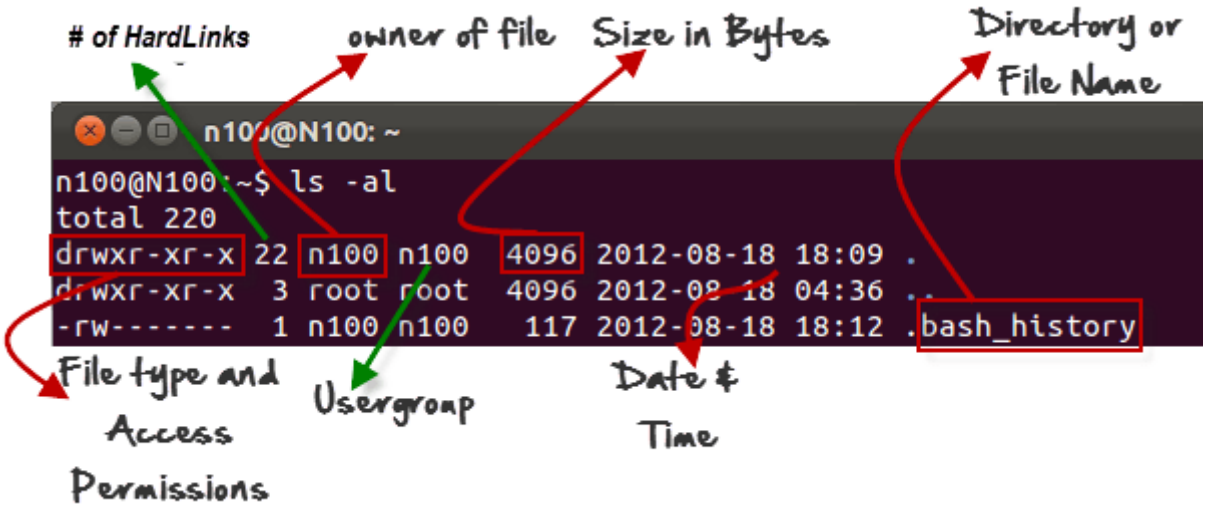
NOTE: The command is case-sensitive. If you enter, "**ls - r**" you will get an error.

'ls -al' gives detailed information of the files. The command provides information in a columnar format. The columns contain the following information:

1st Column	**File type and access permissions**
2nd Column	# of HardLinks to the File
3rd Column	Owner and the creator of the file

4th Column	Group of the owner
5th Column	File size in Bytes
6th Column	Date and Time
7th Column	Directory or File name

Let's see an example -



Listing Hidden Files

Hidden items in UNIX/Linux begin with - • "period" symbol at the start, of the file or directory.

Any Directory/file starting with a '.' will not be seen unless you request for it. To view hidden files, use the command.

```
ls -a
```

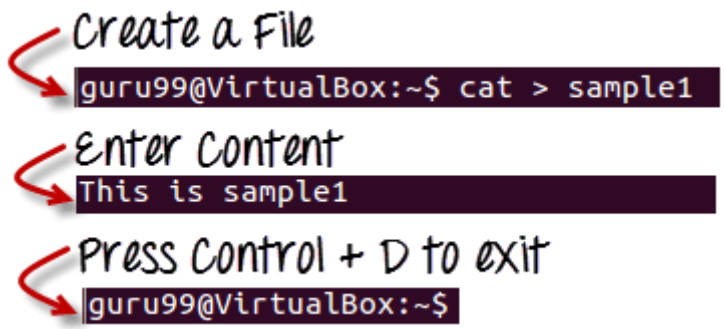
```
guru99@VirtualBox:~$ ls -a
.                .dmrc              .ICEauthority      sample
..               Documents          .local             sample1
.bash_history    Downloads          .mission-control   sample2
.bash_logout     examples.desktop   Music              Templates
.bashrc          .gconf             Pictures           .thumbnails
.cache           .gnome2            .profile           Videos
.config          .gstreamer-0.10    Public             .Xauthority
.dbus            .gtk-bookmarks     .pulse             .xsession-erro
Desktop          .gvfs              .pulse-cookie
guru99@VirtualBox:~$
```

Creating & Viewing Files

The 'cat' server command is used to display text files. It can also be used for copying, combining and creating new text files. Let's see how it works.

To create a new file, use the command

1. cat > filename
2. Add content
3. Press 'ctrl + d' to return to command prompt.



How to create and view files in Linux/Unix

To view a file, use the command -

```
cat filename
```

Let's see the file we just created -

```
guru99@VirtualBox:~$ cat sample1
This is sample1
```

Let's see another file sample2

```
guru99@VirtualBox:~$ cat > sample2
This is sample2
```

The syntax to combine 2 files is -

```
cat file1 file2 > newfilename
```

Let's combine sample 1 and sample 2.

```
guru99@VirtualBox:~$ cat sample1 sample2 > sample
```

As soon as you insert this command and hit enter, the files are concatenated, but you do not see a result. This is because **Bash Shell (Terminal) is silent type**. Shell Commands will never give you a confirmation message like "OK" or "Command Successfully Executed". It will only show a message when something goes wrong or when an error has occurred.

To view the new combo file "sample" use the command

```
cat sample
```

```
guru99@VirtualBox:~$ cat sample
This is sample1
This is sample2
```

Note: Only text files can be displayed and combined using this command.

Deleting Files

The 'rm' command removes files from the system without confirmation.

To remove a file use syntax -

```
rm filename
```

How to delete files using Linux/Unix Commands

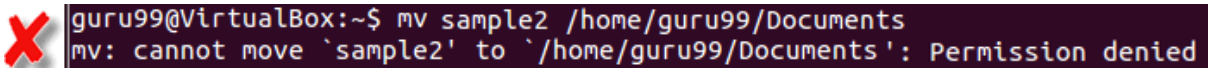
Moving and Re-naming files

To move a file, use the command.

```
mv filename new_file_location
```

Suppose we want to move the file "sample2" to location /home/guru99/Documents. Executing the command

mv sample2 /home/guru99/Documents



mv command needs super user permission. Currently, we are executing the command as a standard user. Hence we get the above error. To overcome the error use command.

```
sudo command_you_want_to_execute
```

Sudo program allows regular users to run programs with the security privileges of the superuser or root.

Sudo command will ask for password authentication. Though, you do not need to know the root password. You can supply your own password. After authentication, the system will invoke the requested command.

Sudo maintains a log of each command run. System administrators can trackback the person responsible for undesirable changes in the system.

```
guru99@VirtualBox:~$ sudo mv sample2 /home/quru99/Documents
[sudo] password for guru99: ****
guru99@VirtualBox:~$
```

For renaming file:

```
mv filename newfilename
```

```
guru99@VirtualBox:~$ mv test test1
guru99@VirtualBox:~$ ls
Desktop    Downloads          Music     Public     test1
Documents  examples.desktop   Pictures  Templates  Videos
guru99@VirtualBox:~$
```

NOTE: By default, the password you entered for sudo is retained for 15 minutes per terminal. This eliminates the need of entering the password time and again.

You only need root/sudo privileges, only if the command involves files or directories not owned by the user or group running the commands

Directory Manipulations

Directory Manipulation in Linux/Unix

Enough with File manipulations! Let's learn some directory manipulation Linux basic commands.

Creating Directories

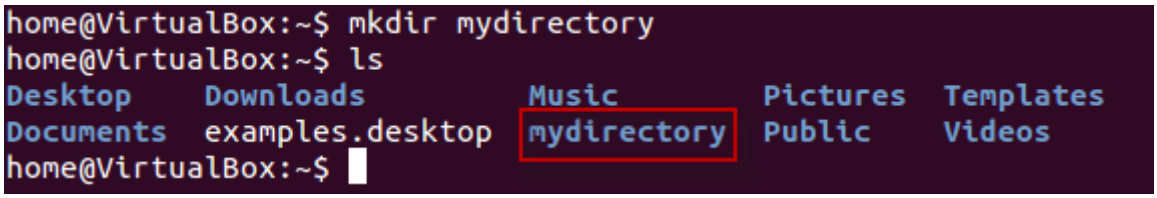
Directories can be created on a Linux operating system using the following command

```
mkdir directoryname
```

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

For example,

```
mkdir mydirectory
```



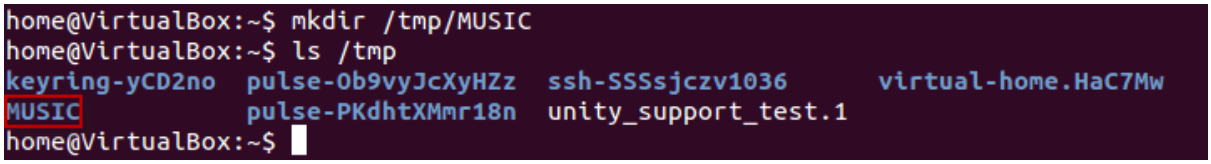
If you want to create a directory in a different location other than 'Home directory', you could use the following command -

```
mkdir
```

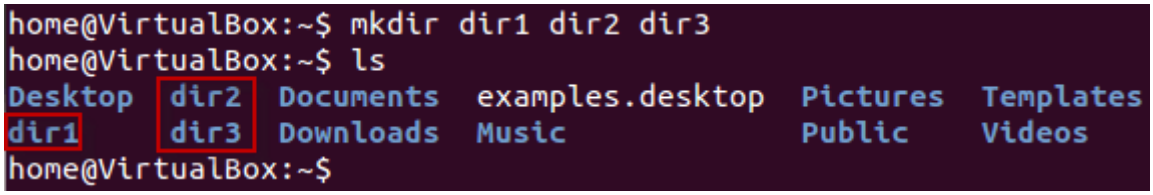
For example:

```
mkdir /tmp/MUSIC
```

will create a directory 'Music' under '/tmp' directory



You can also create more than one directory at a time.



Removing Directories

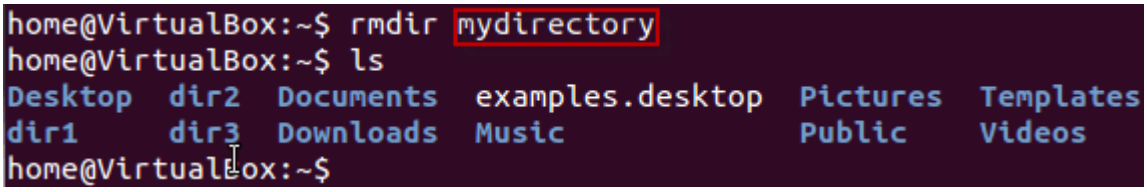
To remove a directory, use the command -

```
rmdir directoryname
```

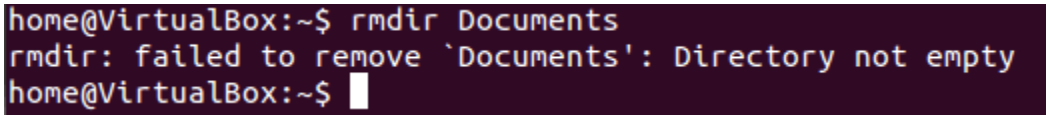
Example

```
rmdir mydirectory
```

will delete the directory mydirectory



Tip: Ensure that there is no file / sub-directory under the directory that you want to delete. Delete the files/sub-directory first before deleting the parent directory.

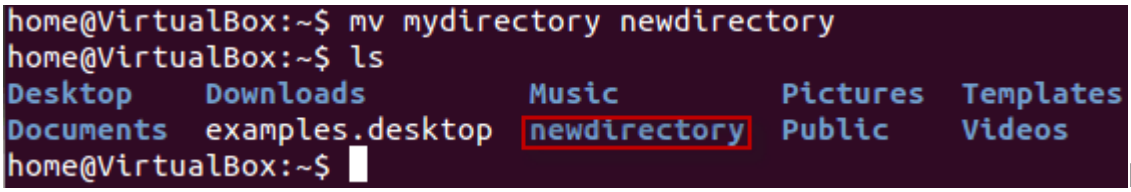


Renaming Directory

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

```
mv directoryname newdirectoryname
```

Let us try it:



How to rename a directory using Linux/Unix Commands

Other Important Commands

The 'Man' command

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

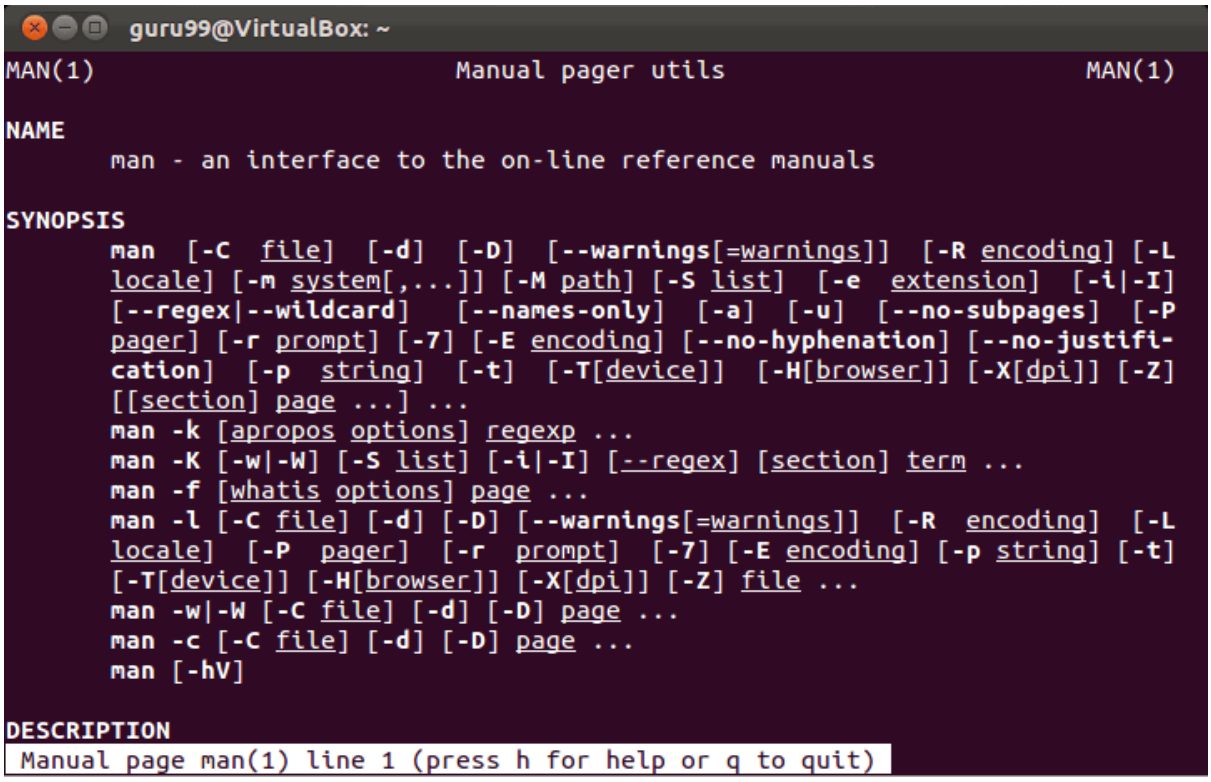
To get help on any command that you do not understand, you can type

```
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

```
guru99@VirtualBox:~$ man man
```



The History Command

History command shows all the basic commands in Linux 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.

```
guru99@VirtualBox:~$ history
    1  cat > sample
    2  cat sample
    3  cat sample ^a
    4  cat sample a
    5  cat sample | grep a
    6  cat sample | grep ^a
    7  useradd home
    8  useradd mycomputer
    9  sudo useradd mycomputer
   10  sudo adduser MyLinux
   11  sudo adduser mylinux
   12  vi scriptsample.sh
```

The clear command

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.

```
  141  man
  142  3a
  143  man intro
  144  man ls
  145  man cat
  146  man man
  147  history
  148  146
  149  history 146
  150  history
  151  clear
  152  history
guru99@VirtualBox:~$ clear
```

The window gets cleared

```
guru99@VirtualBox:~$
```

Pasting commands into the terminal

Many times you would have to type in long commands on the Terminal. Well, it can be annoying at times, and if you want to avoid such a situation then copy, pasting the commands can come to rescue.

For copying, the text from a source, you would use **Ctrl + c,** but for pasting it on the Terminal, you need to use **Ctrl + Shift + p**. You can also try **Shift + Insert or select Edit>Paste on the menu**

NOTE: With Linux upgrades, these shortcuts keep changing. You can set your preferred shortcuts via Terminal> Edit> Keyboard Shortcuts.

Printing in Unix/Linux

How to print a file using Linux/Unix commands

Let's try out some basic Unix commands list which **can print files** in a format you want. What more, your original file does not get affected at all by the formatting that you do. Let us learn about these commands and their use.

'pr' command

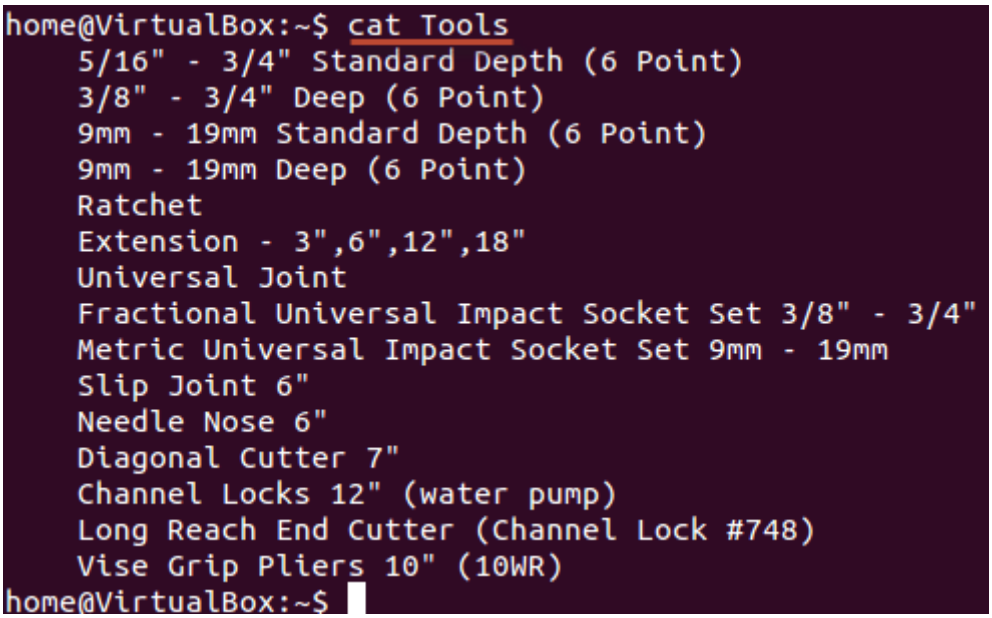
This command helps in formatting the file for printing on the terminal. There are many options available with this command which help in making desired format changes on file. The most used '**pr'** options are listed below.

Option	Function
-x	Divides the data into 'x' columns
-h "header"	Assigns "header" value as the report header
-t	Does not print the header and top/bottom margins

-d	Double spaces the output file
-n	Denotes all line with numbers
-l page length	Defines the lines (page length) in a page. Default is 56
-o margin	Formats the page by the margin number

Dividing data into columns

'**Tools'** is a file (shown below).



We want its content to be arranged in three columns. The syntax for the same would be:

```
pr -x Filename
```

The '-x' option with the 'pr' command divides the data into x columns.

```
home@VirtualBox:~$ pr -3 Tools

2012-09-02 19:27                    Tools                    Page 1


    5/16" - 3/4" Standa     Extension - 3",6",1     Needle Nose 6"
    3/8" - 3/4" Deep (6     Universal Joint         Diagonal Cutter 7"
    9mm - 19mm Standard     Fractional Universa     Channel Locks 12" (
    9mm - 19mm Deep (6      Metric Universal Im     Long Reach End Cutt
    Ratchet                 Slip Joint 6"           Vise Grip Pliers 10
```

Assigning a header

The syntax is:

```
pr -h "Header" Filename
```

The '-h' options assigns "header" value as the report header.

```
home@VirtualBox:~$ pr -3 -h "Important Tools" Tools

2012-09-02 19:27               Important Tools               Page 1


    5/16" - 3/4" Standa     Extension - 3",6",1     Needle Nose 6"
    3/8" - 3/4" Deep (6     Universal Joint         Diagonal Cutter 7"
    9mm - 19mm Standard     Fractional Universa     Channel Locks 12" (
    9mm - 19mm Deep (6      Metric Universal Im     Long Reach End Cutt
    Ratchet                 Slip Joint 6"           Vise Grip Pliers 10
```

As shown above, we have arranged the file in 3 columns and assigned a header

Denoting all lines with numbers

The syntax is:

```
pr -n Filename
```

This command denotes all the lines in the file with numbers.

```
home@VirtualBox:~$ pr -n Tools

2012-09-02 19:27                    Tools                    Page 1


    1       5/16" - 3/4" Standard Depth (6 Point)
    2       3/8" - 3/4" Deep (6 Point)
    3       9mm - 19mm Standard Depth (6 Point)
    4       9mm - 19mm Deep (6 Point)
    5       Ratchet
    6       Extension - 3",6",12",18"
    7       Universal Joint
```

These are some of the 'pr' command options that you can use to modify the file format.

Printing a file

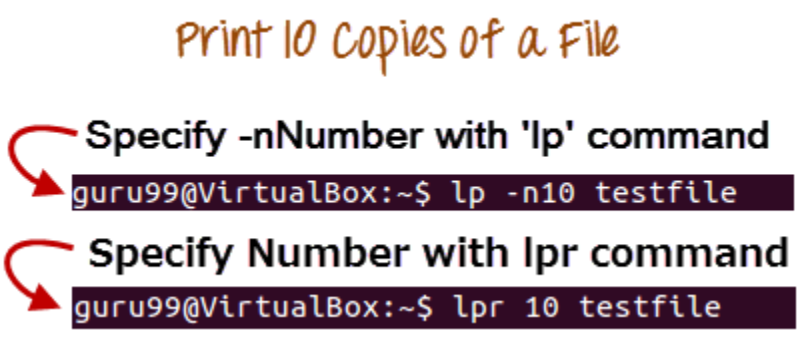
Once you are **done with the formatting,** and it is time for you to get a **hard copy** of the file, you need to use the following command:

```
lp Filename
```

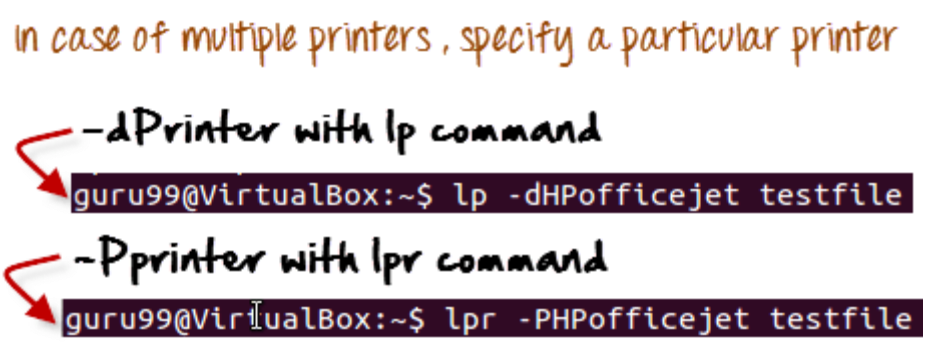
or

```
lpr Filename
```

In case you want to print multiple copies of the file, you can use the number modifier.

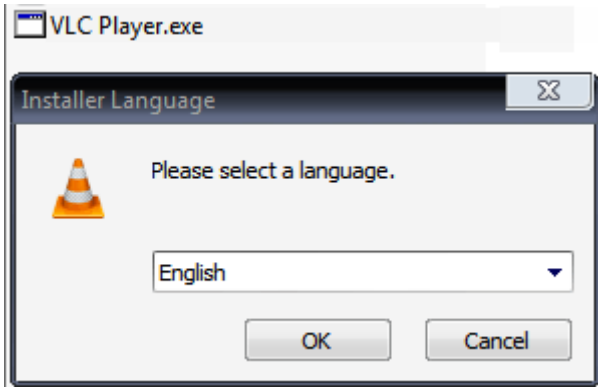


In case you have multiple printers configured, you can specify a particular printer using the Printer modifier



Installing Software

In windows, the installation of a program is done by running the setup.exe file. The installation bundle contains the program as well various dependent components required to run the program correctly.



Using Linux/Unix basic commands, installation files in Linux are distributed as packages. But the package contains only the program itself. Any dependent components will have to be installed separately which are usually available as packages themselves.

You can use the **apt** commands to install or remove a package. Let's update all the installed packages in our system using command -

```
sudo apt-get update
```

```
guru99@VirtualBox:~$ sudo apt-get update
Ign http://extras.ubuntu.com precise InRelease
Ign http://security.ubuntu.com precise-security InRelease
Ign http://in.archive.ubuntu.com precise InRelease
Ign http://in.archive.ubuntu.com precise-updates InRelease
Get:1 http://security.ubuntu.com precise-security Release.gpg [198 B]
Get:2 http://extras.ubuntu.com precise Release.gpg [72 B]
Ign http://in.archive.ubuntu.com precise-backports InRelease
Hit http://extras.ubuntu.com precise Release
Hit http://in.archive.ubuntu.com precise Release.gpg
Hit http://extras.ubuntu.com precise/main Sources
Get:3 http://in.archive.ubuntu.com precise-updates Release.gpg [198 B]
```

updates all installed packages

```
Hit http://in.archive.ubuntu.com precise-updates/univers
Hit http://in.archive.ubuntu.com precise-backports/main
Hit http://in.archive.ubuntu.com precise-backports/multi
Hit http://in.archive.ubuntu.com precise-backports/restr
Hit http://in.archive.ubuntu.com precise-backports/unive
Fetched 1,293 kB in 27s (47.4 kB/s)
Reading package lists... Done
```

The easy and popular way to install programs on Ubuntu is by using the Software center as most of the software packages are available on it and it is far more secure than the files downloaded from the internet.

Linux Mail Command

For sending mails through a terminal, you will need to install packages 'mailutils'.

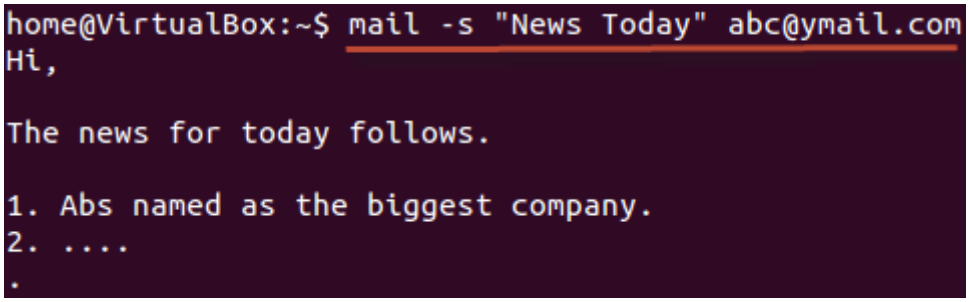
The command syntax is -

```
sudo apt-get install packagename
```

Once done, you can then use the following syntax for sending an email.

```
mail -s 'subject' -c 'cc-address' -b 'bcc-address' 'to-address'
```

This will look like:



Press Cntrl+D you are finished writing the mail. The mail will be sent to the mentioned address.

Summary

- You can format and print a file directly from the terminal. The formatting you do on the files does not affect the file contents
- In Unix/Linux, software is installed in the form of packages. A package contains the program itself. Any dependent component needs to be downloaded separately.
- You can also send e-mails from terminal using the **'mail'** network commands. It is very useful Linux command.

Linux Command List

Below is a Cheat Sheet of Linux commands list we have learned in this Linux commands tutorial

Command	Description

ls	Lists all files and directories in the present working directory
ls - R	Lists files in sub-directories as well
ls - a	Lists hidden files as well
ls - al	Lists files and directories with detailed information like permissions, size, owner, etc.
cat > filename	Creates a new file
cat filename	Displays the file content
cat file1 file2 > file3	Joins two files (file1, file2) and stores the output in a new file (file3)
mv file "new file path"	Moves the files to the new location
mv filename new_file_name	Renames the file to a new filename
sudo	Allows regular users to run programs with the security privileges of the superuser or root
rm filename	Deletes a file
man	Gives help information on a command
history	Gives a list of all past basic Linux commands list typed in the current terminal session
clear	Clears the terminal
mkdir directoryname	Creates a new directory in the present working directory or a at the specified path
rmdir	Deletes a directory
mv	Renames a directory
pr -x	Divides the file into x columns

pr -h	Assigns a header to the file
pr -n	Denotes the file with Line Numbers
lp -nc lpr c	Prints "c" copies of the File
lp -d lpr -P	Specifies name of the printer
apt-get	Command used to install and update packages
mail -s 'subject' -c 'cc-address' -b 'bcc-address' 'to-address'	Command to send email

What is the VI editor?

The VI editor is the most popular and classic text editor in the Linux family. Below, are some reasons which make it a widely used editor –

1) It is available in almost all Linux Distributions

2) It works the same across different platforms and Distributions

3) It is user-friendly. Hence, millions of Linux users love it and use it for their editing needs

Nowadays, there are advanced versions of the vi editor available, and the most popular one is **VIM** which is **V**i **Im**proved. Some of the other ones are Elvis, Nvi, Nano, and Vile. It is wise to learn vi because it is feature-rich and offers endless possibilities to edit a file.

To work on VI editor, you need to understand **its operation modes**. They can be divided into two main parts.

vi Command mode:

- The vi editor opens in this mode, and it only **understands commands**
- In this mode, you can, **move the cursor and cut, copy, paste the text**
- This mode also saves the changes you have made to the file
- **Commands are case sensitive.** You should use the right letter case.

vi Editor Insert mode:

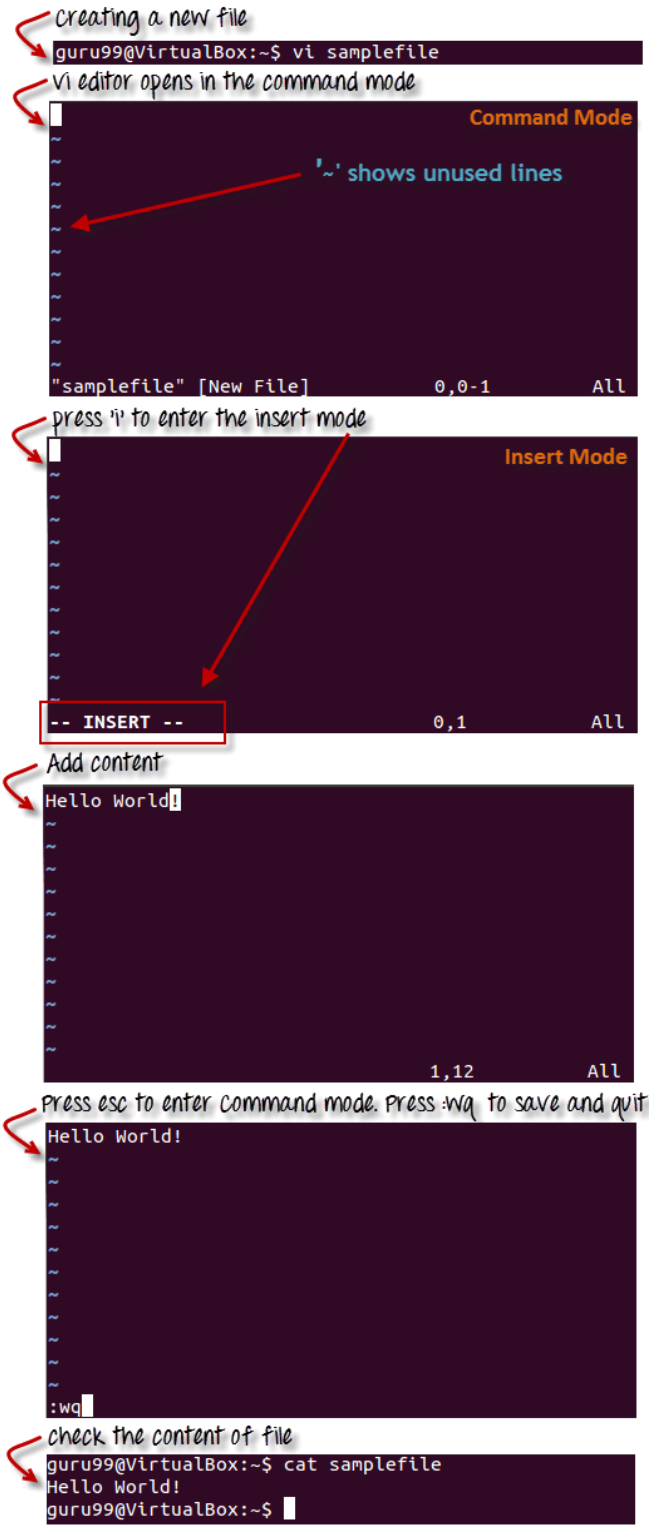
- This mode is for inserting text in the file.
- You can switch to the Insert mode from the command mode **by pressing 'i' on the keyboard**
- Once you are in Insert mode, any key would be taken as an input for the file on which you are currently working.
- To return to the command mode and save the changes you have made you need to press the Esc key

How to use vi editor

To launch the VI Editor -Open the Terminal (CLI) and type

```
vi <filename_NEW> or <filename_EXISTING>
```

And if you specify an existing file, then the editor would open it for you to edit. Else, you can create a new file.



VI Editing commands

- i - Insert at cursor (goes into insert mode)
- a - Write after cursor (goes into insert mode)

- A - Write at the end of line (goes into insert mode)
- ESC - Terminate insert mode
- u - Undo last change
- U - Undo all changes to the entire line
- o - Open a new line (goes into insert mode)
- dd - Delete line
- 3dd - Delete 3 lines.
- D - Delete contents of line after the cursor
- C - Delete contents of a line after the cursor and insert new text. Press ESC key to end insertion.
- dw - Delete word
- 4dw - Delete 4 words
- cw - Change word
- x - Delete character at the cursor
- r - Replace character
- R - Overwrite characters from cursor onward
- s - Substitute one character under cursor continue to insert
- S - Substitute entire line and begin to insert at the beginning of the line
- ~ - Change case of individual character

Note: You should be in the "**command mode" to execute these commands**. VI editor is **case-sensitive** so make sure you type the commands in the right letter-case.

Make sure you press the right command otherwise you will end up making undesirable changes to the file. You can also enter the insert mode by pressing a, A, o, as required.

Moving within a file

- k - Move cursor up
- j - Move cursor down
- h - Move cursor left
- l - Move cursor right

You need to be in the command mode to move within a file. The default keys for navigation are mentioned below else; You can **also use the arrow keys on the keyboard**.

Saving and Closing the file

- Shift+zz - Save the file and quit
- :w - Save the file but keep it open
- :q - Quit without saving
- :wq - Save the file and quit

You should be in the **command mode to exit the editor and save changes** to the file.