Unit 05: Utilities

CONTENTS

Objectives

After studying this unit, you will be able to:

- Understand the basic utilities
- Work with files
- Understand the Pipe
- Understand the compressing and archiving of files
- Understand the locating commands

Introduction

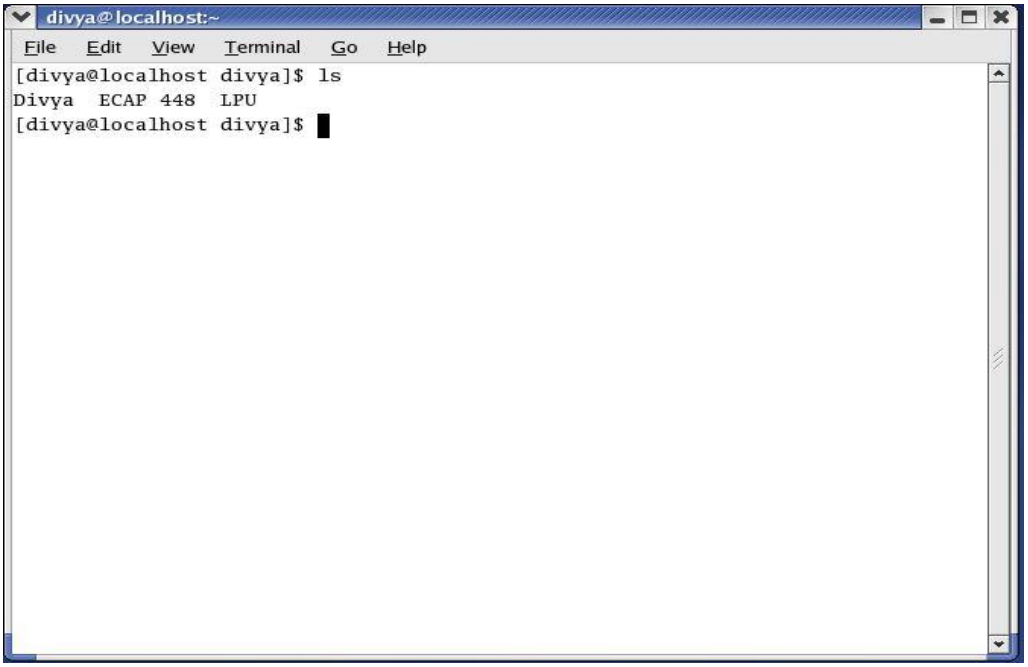
Command-line utilities are often faster, more powerful, or more complete than their GUI counterparts. When you work with a command-line interface, you are working with a shell. One of the important advantages of Linux is that it comes with thousands of utilities that perform innumerable functions.

- ls
- cat
- rm
- less
- more

5.1 Common Utilities

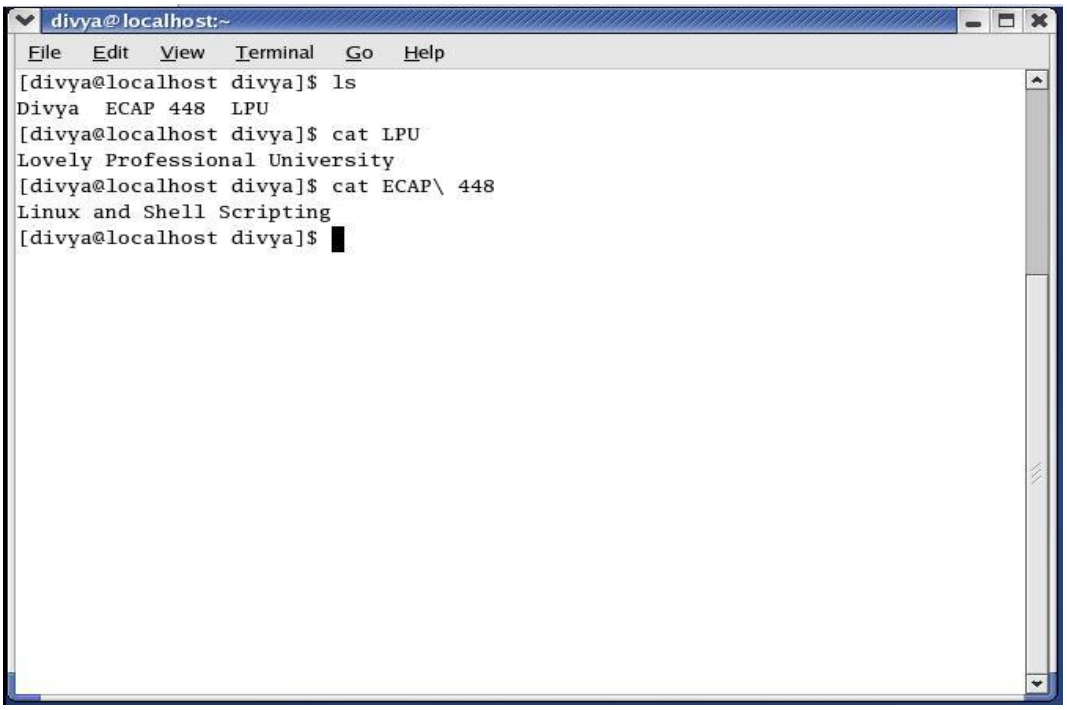
ls: Lists the Names of Files

The ls utility lists the names of files which are available. **ls** is a Linux shell command that lists directory contents of files and directories.



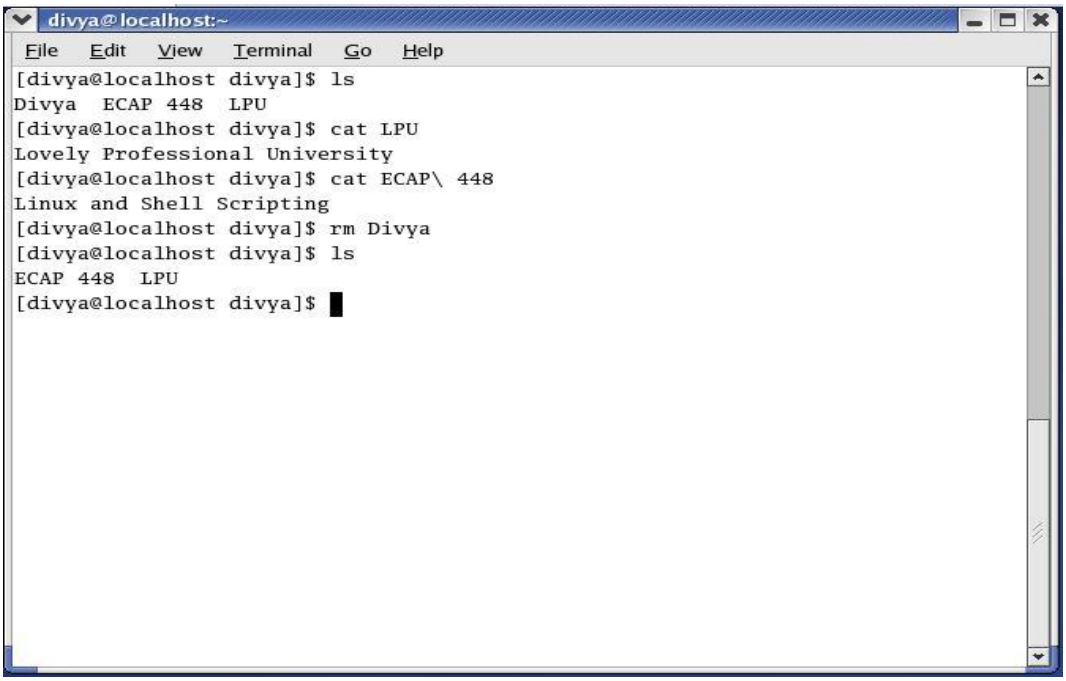
cat: Displays the Text of File

The cat utility displays the contents of a text file. The name of the command is derived from catenate, which means to join, one after the other.

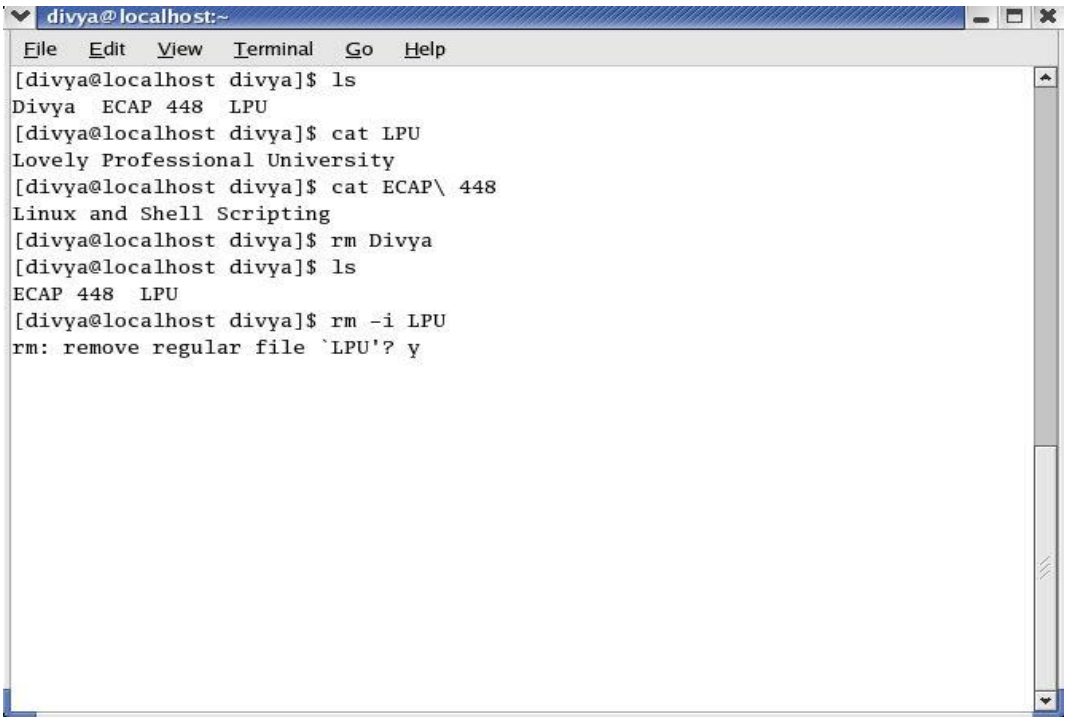


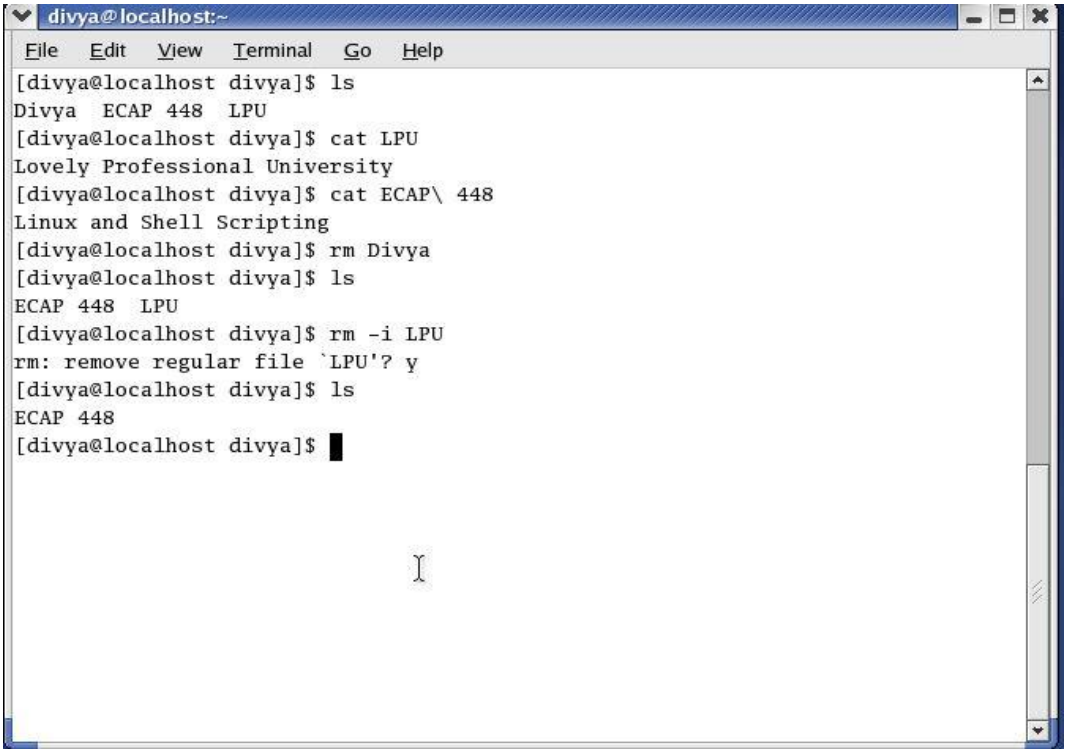
rm: Deletes a File

The rm (remove) utility deletes a file.



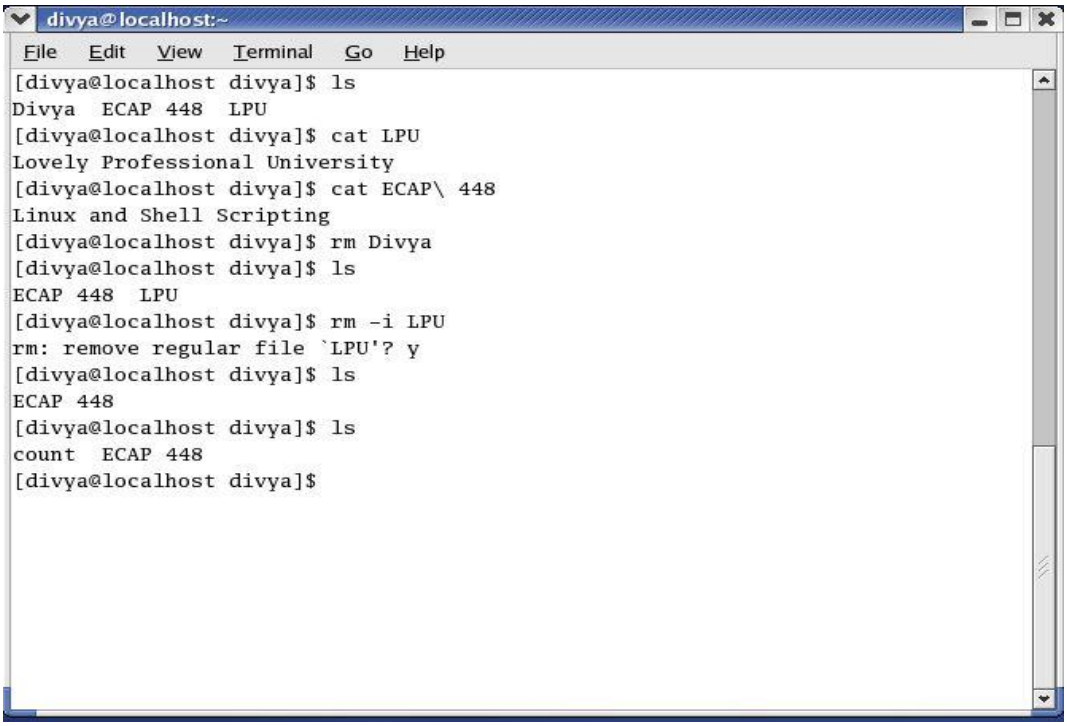
When you follow rm with the –i option and the name of the file you want to delete, rm displays the name of the file and then waits for you to respond with y (yes) before it deletes the file. It does not delete the file if you respond with a string that begins with a character other than y.

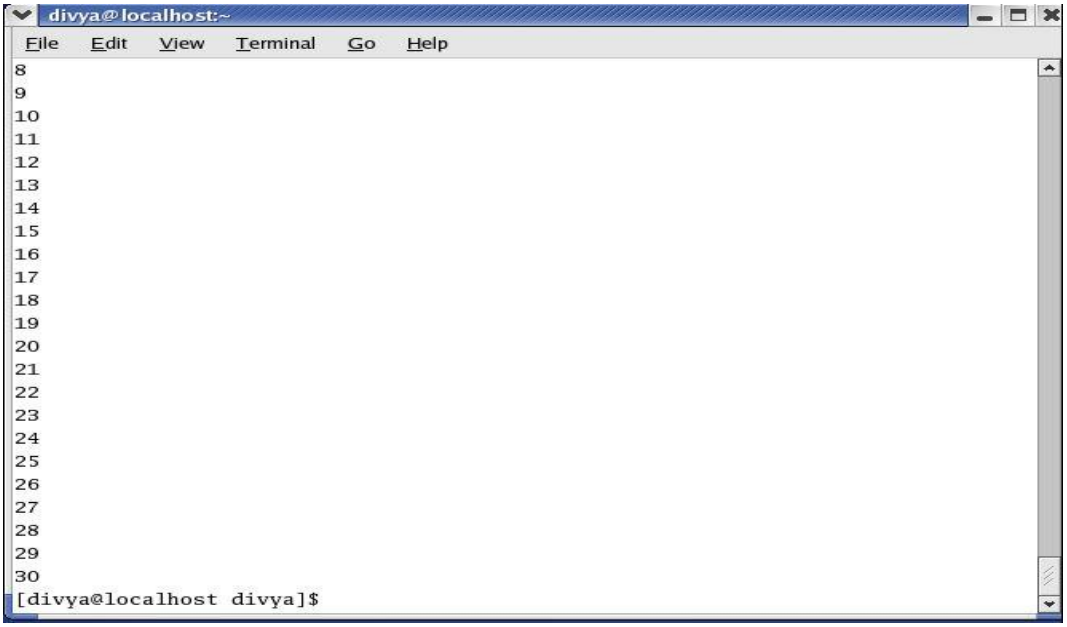




less Is more: Display a Text File One Screen at a Time

It displays a text file one screen at a time. When you want to view a file that is longer than one screen, you can use either the less utility or the more utility. Each of these utilities pauses after displaying a screen of text; press the SPACE bar to display the next screen of text. Because these utilities show one page at a time, they are called pagers. Although less and more are very similar, they have subtle differences. At the end of the file, for example, less displays an END message and waits for you to press q before returning you to the shell. In contrast, more returns you directly to the shell. While using both utilities you can press h to display a Help screen that lists commands you can use while paging through a file.




divya@localhost:~
File Edit View Terminal Go Help
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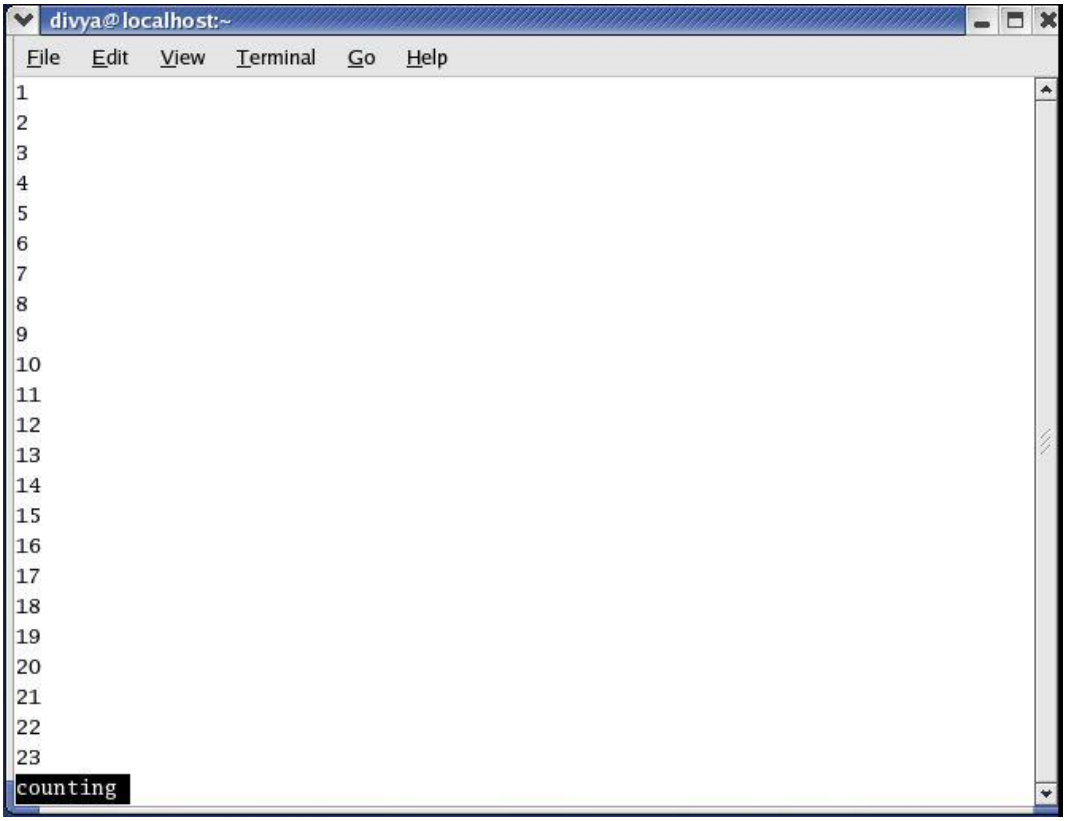
[divya@localhost divya]$


divya@localhost:~
File Edit View Terminal Go Help
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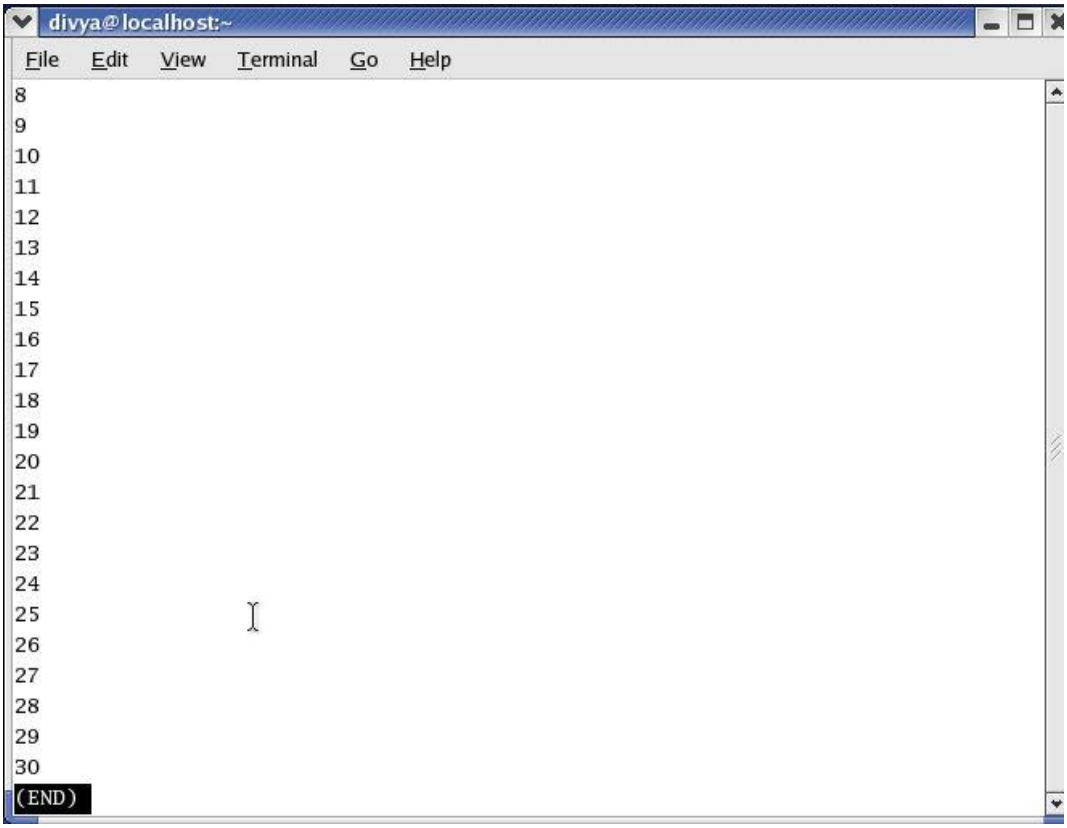
counting


divya@localhost:~
File Edit View Terminal Go Help
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(END)


divya@localhost:~
File Edit View Terminal Go Help
[divya@localhost divya]$ more counting
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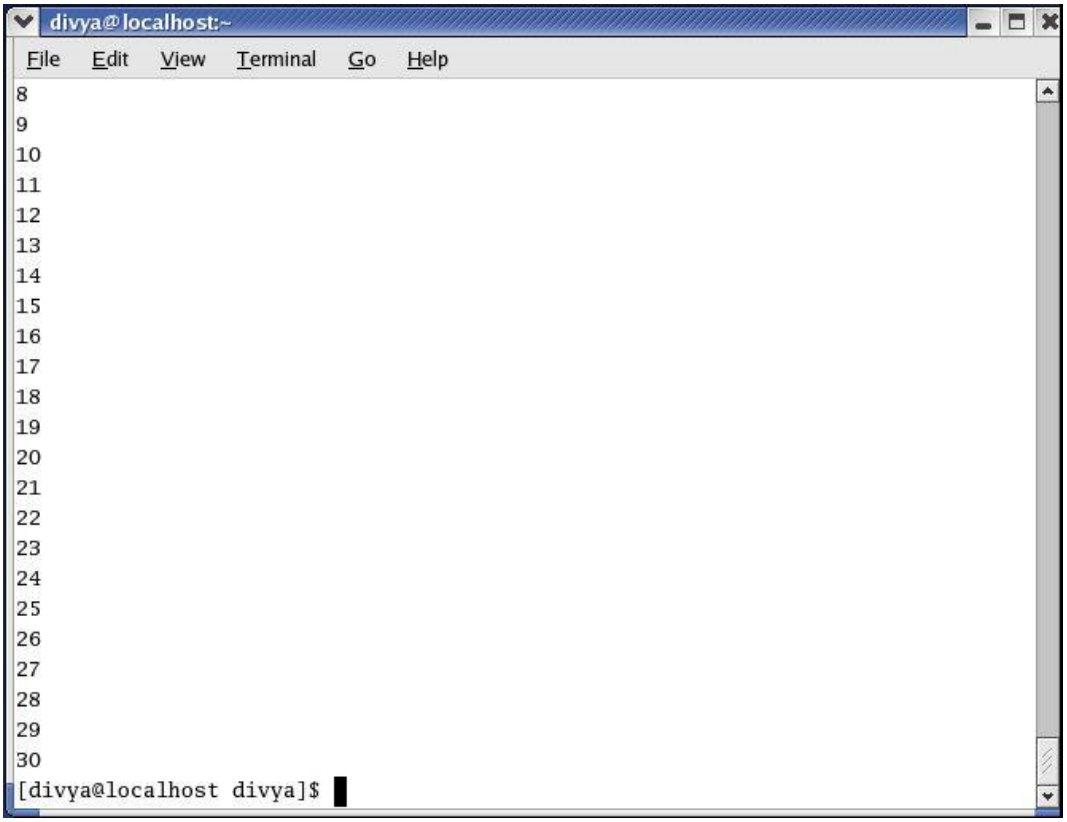
--More--(70%)



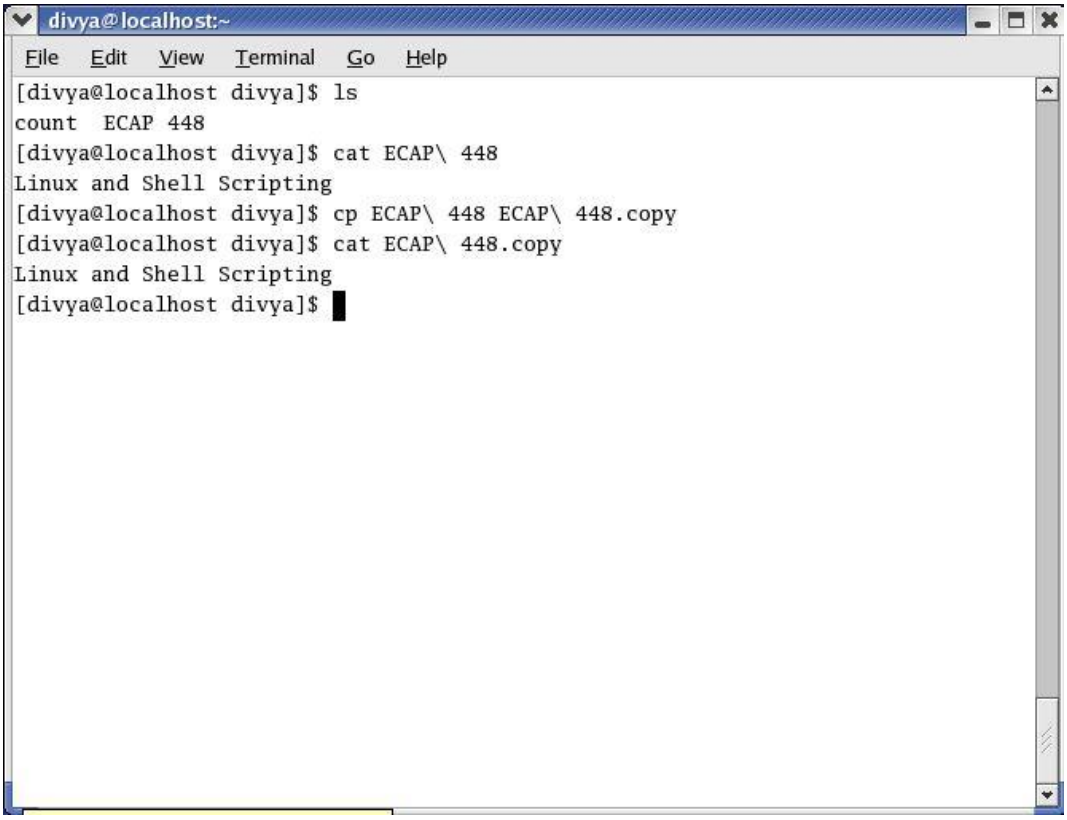
5.2 Working With Files

There are various utilities which we can use when we are working with files. These are:

- cp
- mv
- grep
- head
- tail
- sort
- uniq
- diff
- file

cp: Copies a File

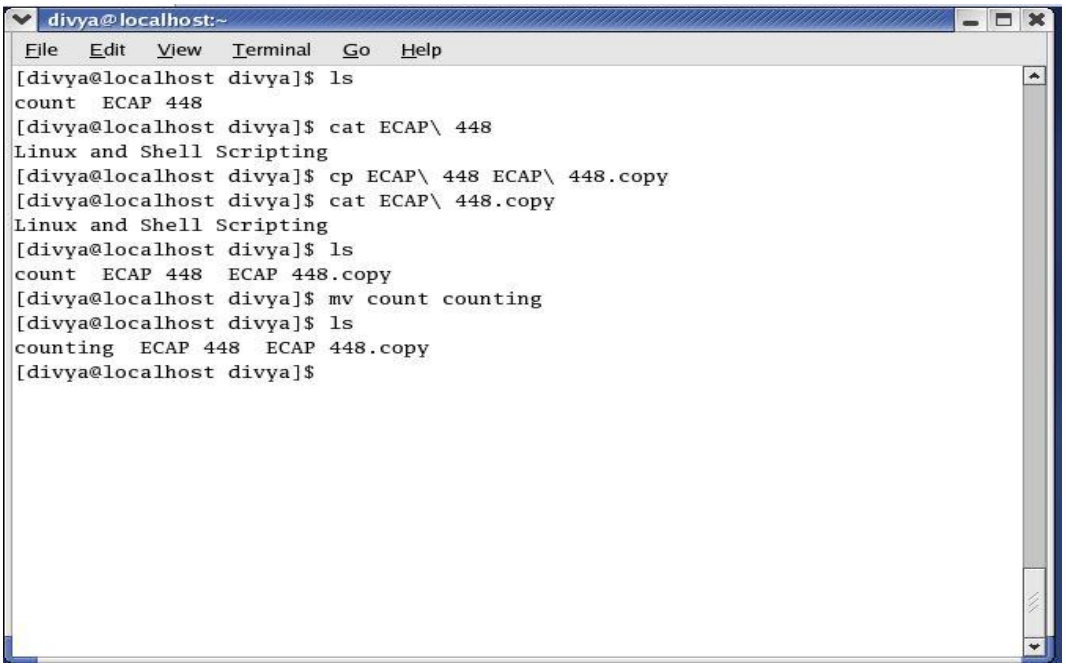
The cp (copy) utility makes a copy of a file. This utility can copy any file, including text and executable program (binary) files. You can use cp to make a backup copy of a file or a copy to experiment with. The cp command line uses the following syntax to specify source and destination files: **cp source-file destination-file**



cp can destroy a file: if the destination-file exists before you give a cp command, cp overwrites it. The cp –i (interactive) option prompts you before it overwrites a file.

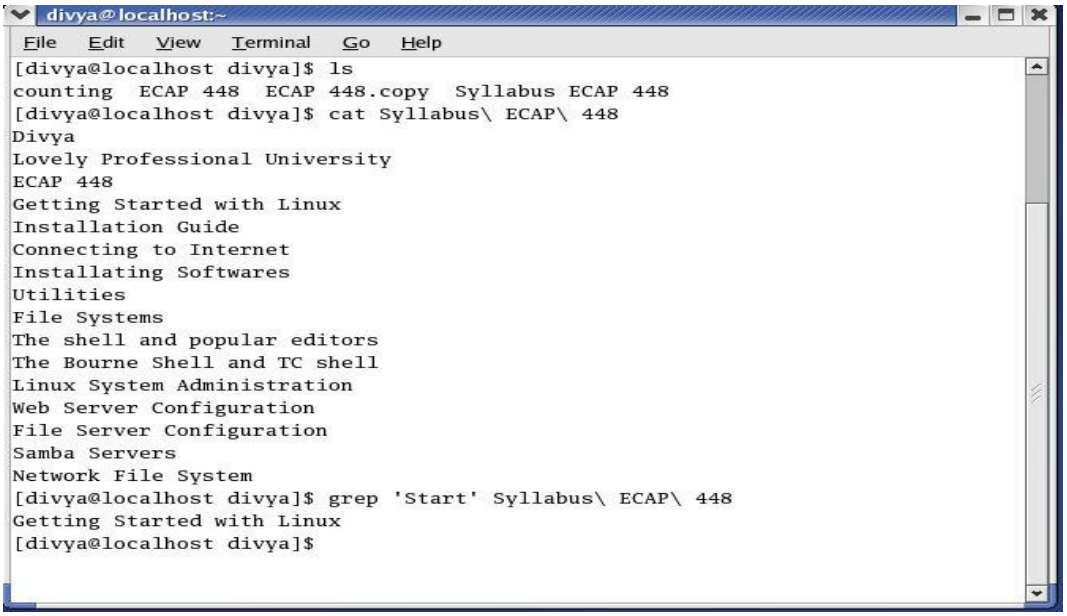
mv: Changes the Name of a File

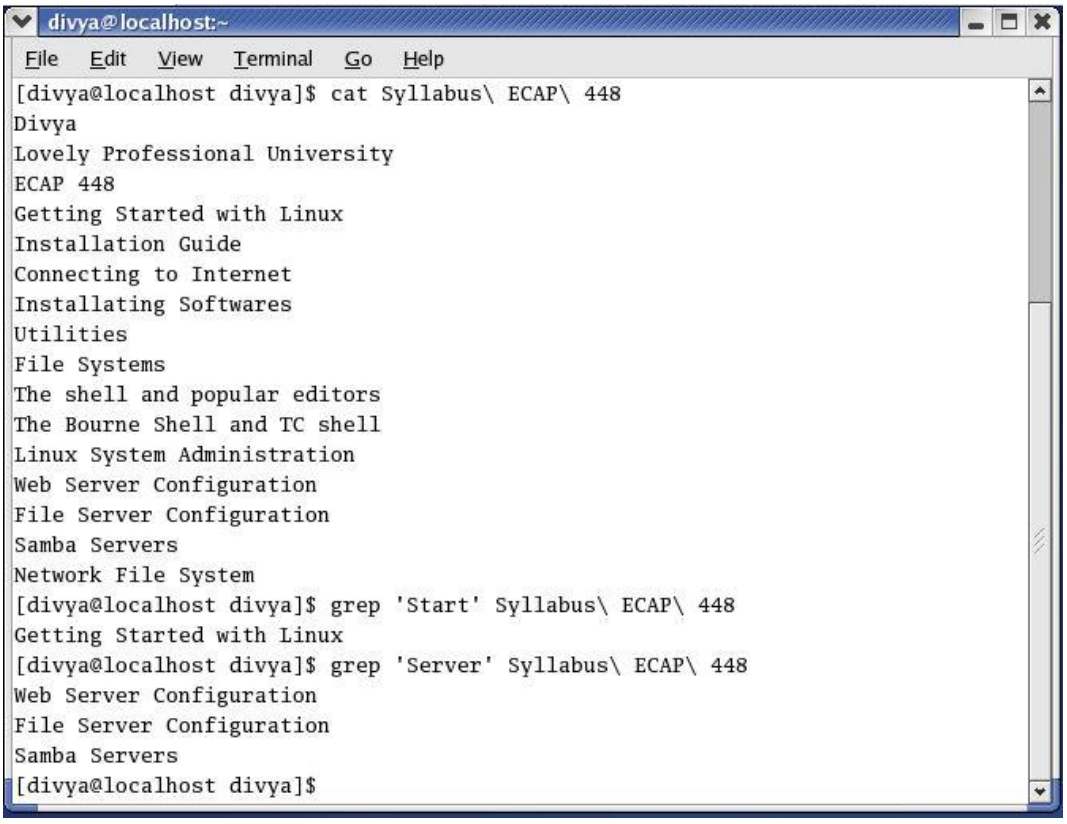
The mv (move) utility can rename a file without making a copy of it. The mv command line specifies an existing file and a new filename using the same syntax as cp: **mv existing-filename new-filename**



grep: Searches for a String

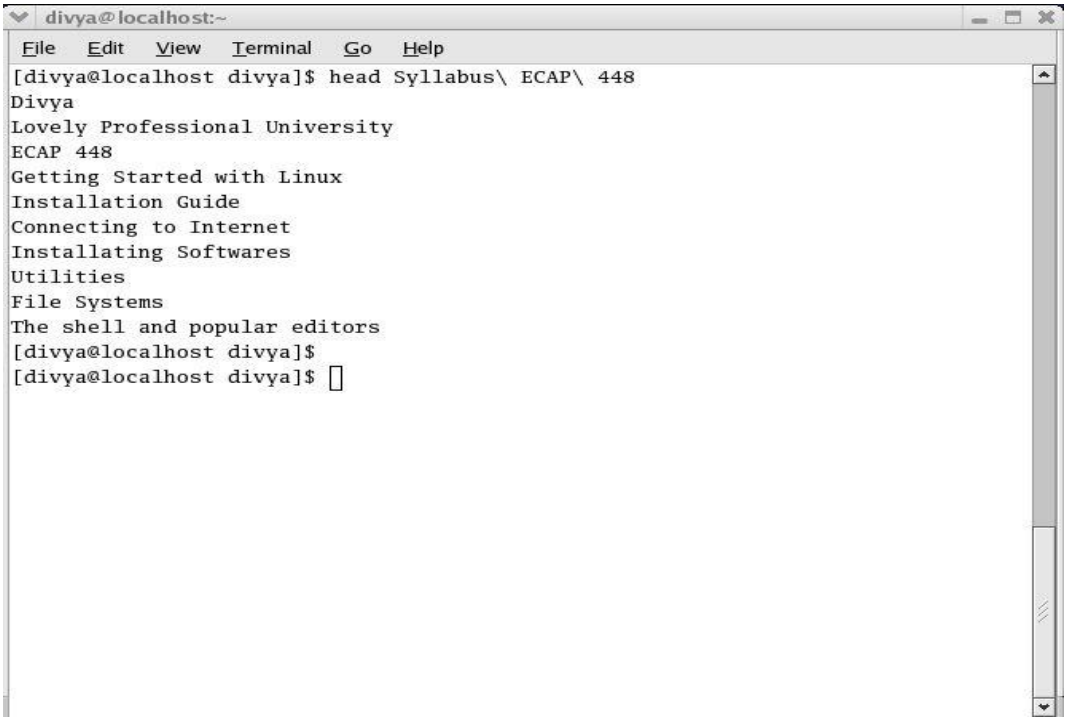
The grep utility searches through one or more files to see whether any contain a specified string of characters. This utility does not change the file it searches but simply displays each line that contains the string.



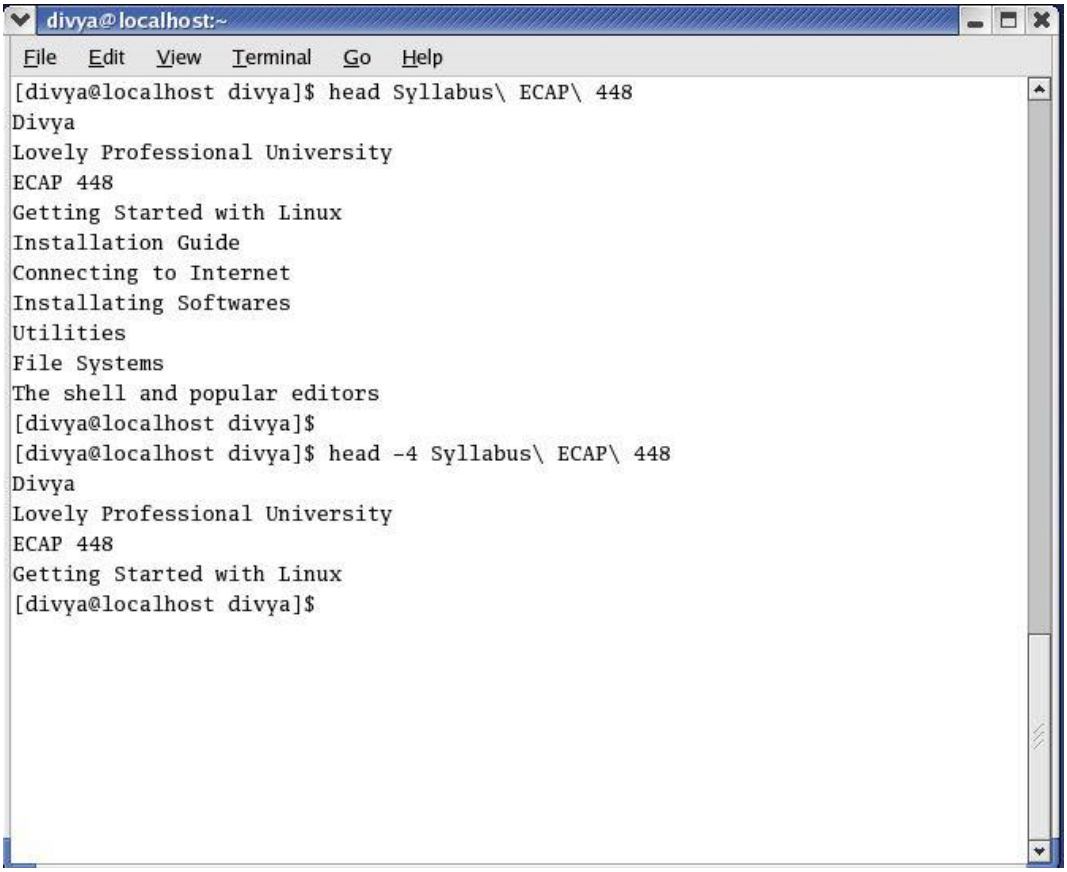


head: Displays the Beginning of a File

By default, the head utility displays the first ten lines of a file. For example, if you have a file named months that lists the 12 months of the year in calendar order, one to a line, then head displays Jan through Oct.

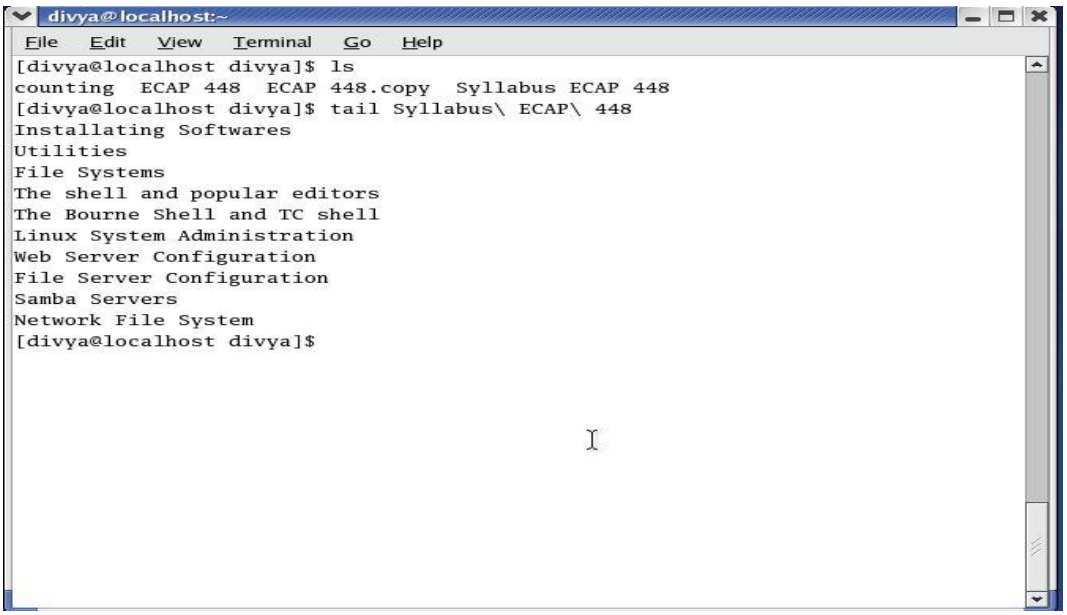


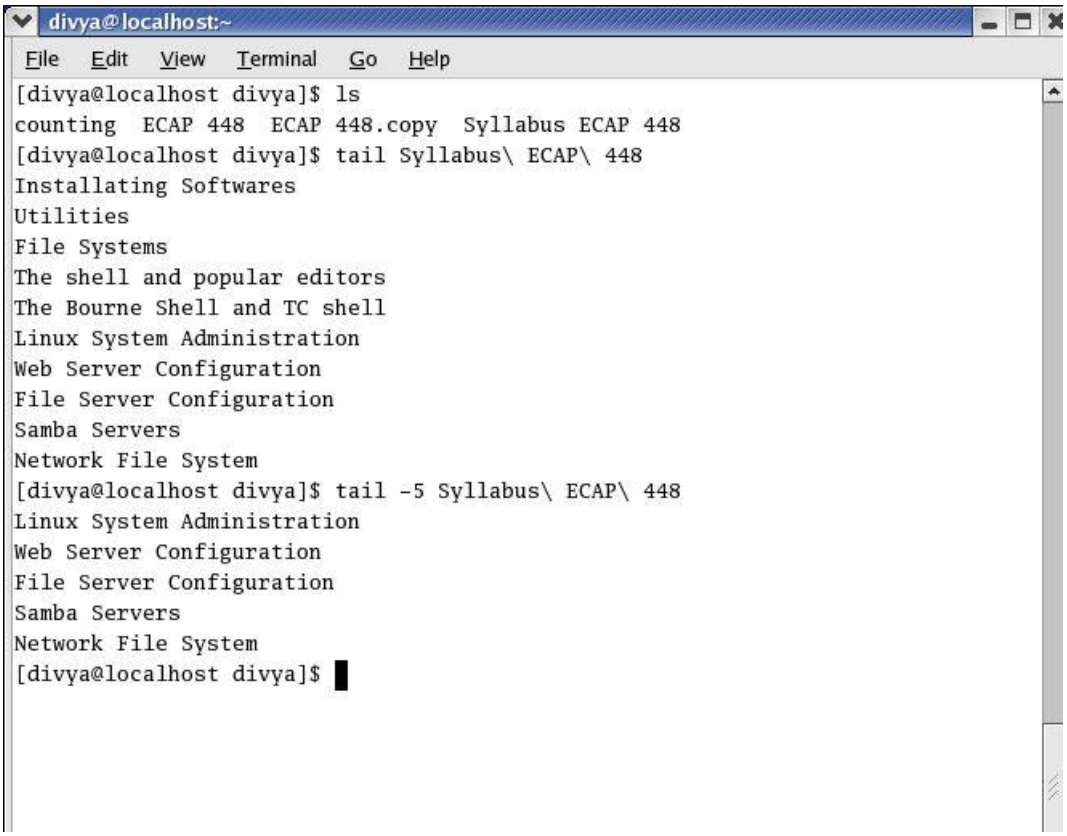
This utility can display any number of lines, so you can use it to look at only the first line of a file, at a full screen, or even more. To specify the number of lines displayed, include a hyphen followed by the number of lines you want head to display.



tail: Displays the End of a File

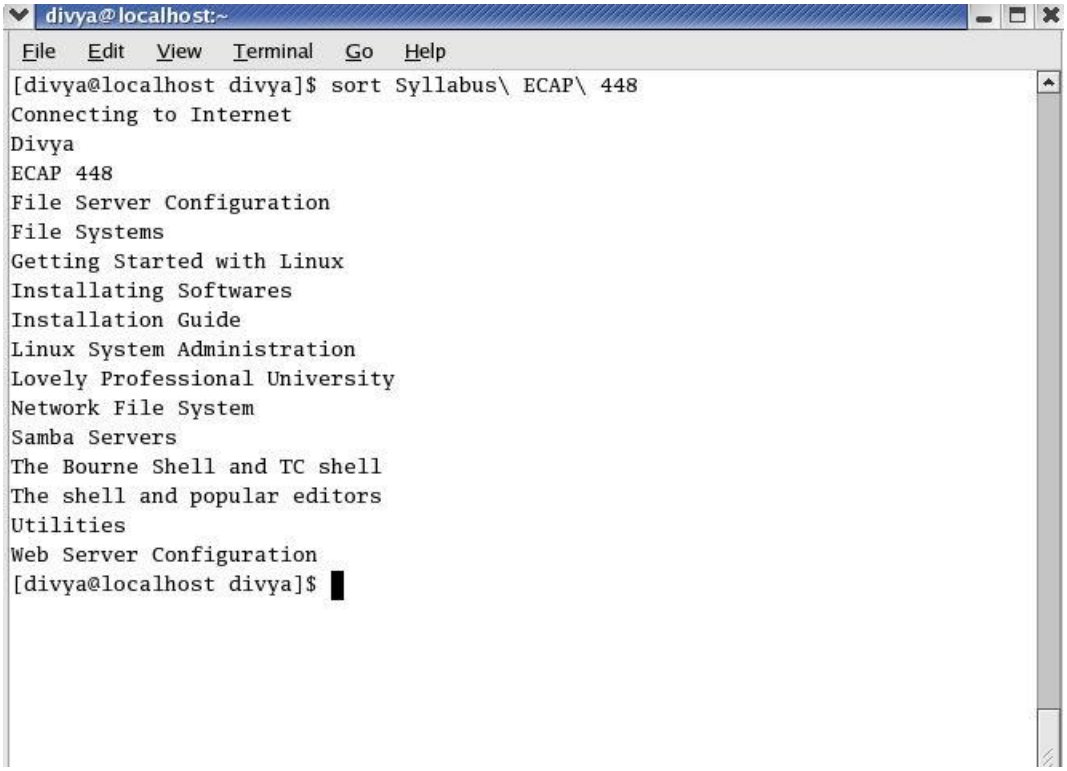
The tail utility is like head but by default displays the last ten lines of a file. Depending on how you invoke it, this utility can display fewer or more than ten lines.





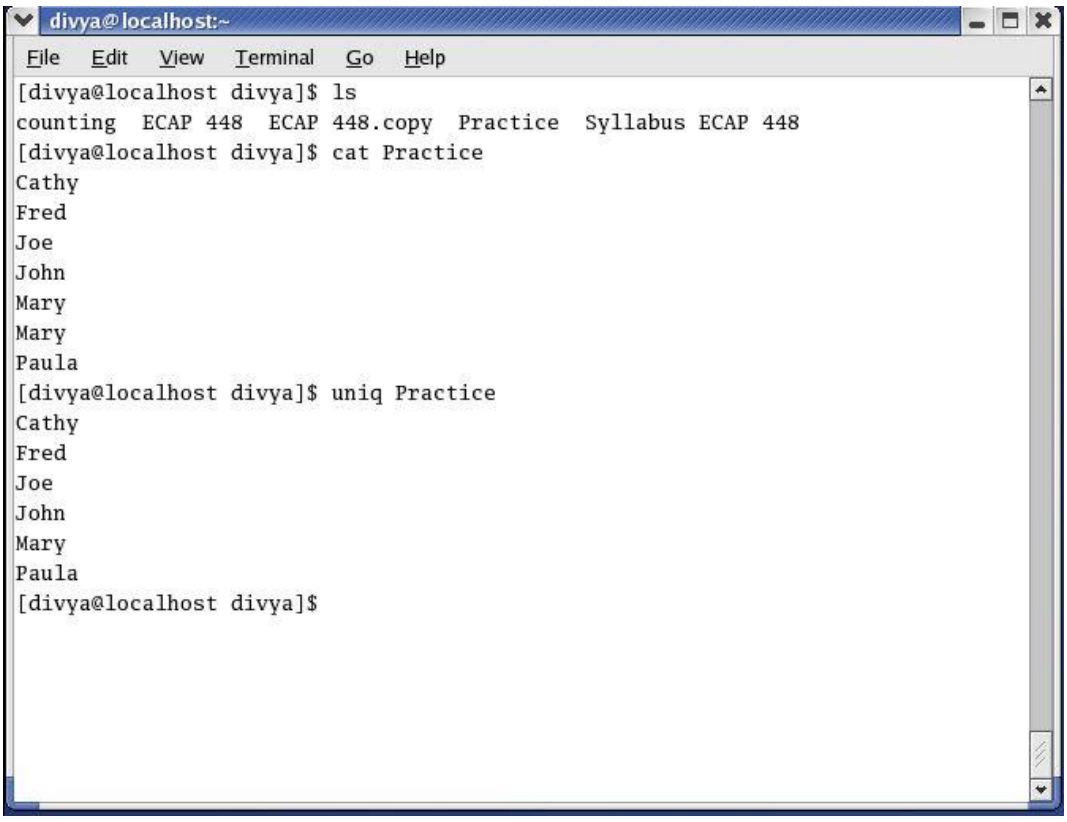
sort: Displays a File in Order

The sort utility displays the contents of a file in order by lines; it does not change the original file.



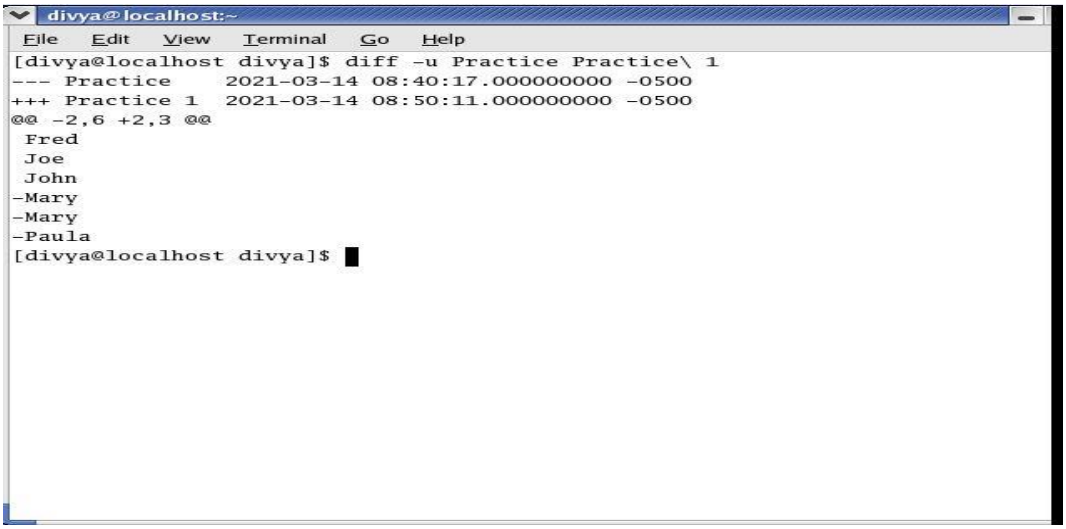
uniq: Removes Duplicate Lines from a File

The uniq (unique) utility displays a file, skipping adjacent duplicate lines, but does not change the original file. If a file contains a list of names and has two successive entries for the same person, uniq skips the duplicate line. If a file is sorted before it is processed by uniq, this utility ensures that no two lines in the file are the same.



diff: Compares Two Files

The diff (difference) utility compares two files and displays a list of the differences between them. This utility does not change either file; it is useful when you want to compare two versions of a letter or a report or two versions of the source code for a program. The diff utility with the –u (unified output format) option first displays two lines indicating which of the files you are comparing will be denoted by a plus sign (+) and which by a minus sign (–).

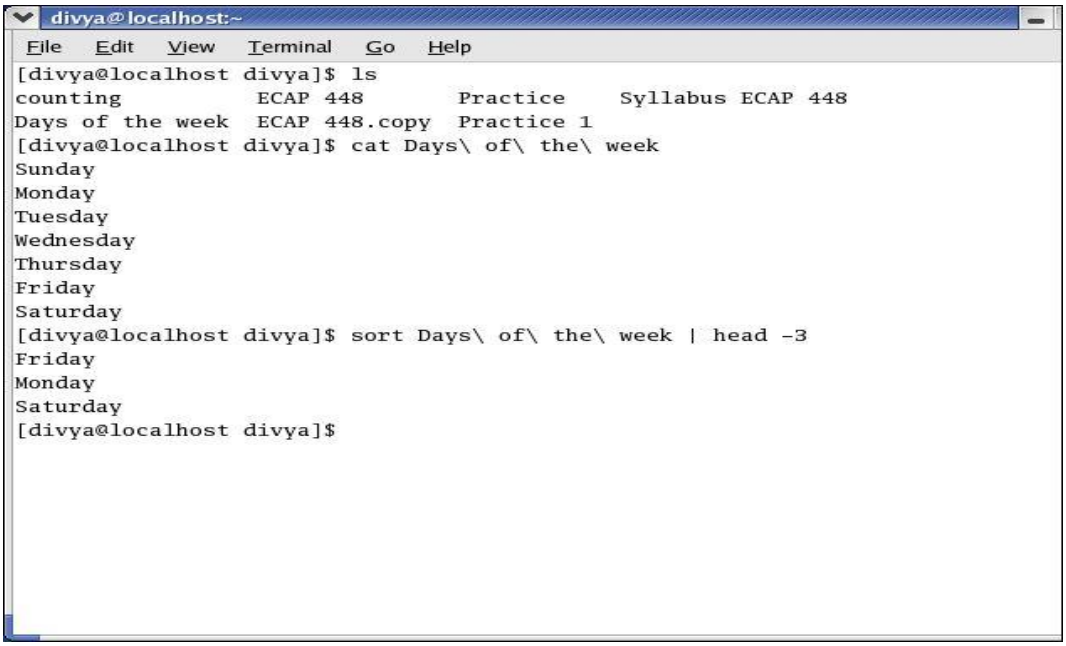


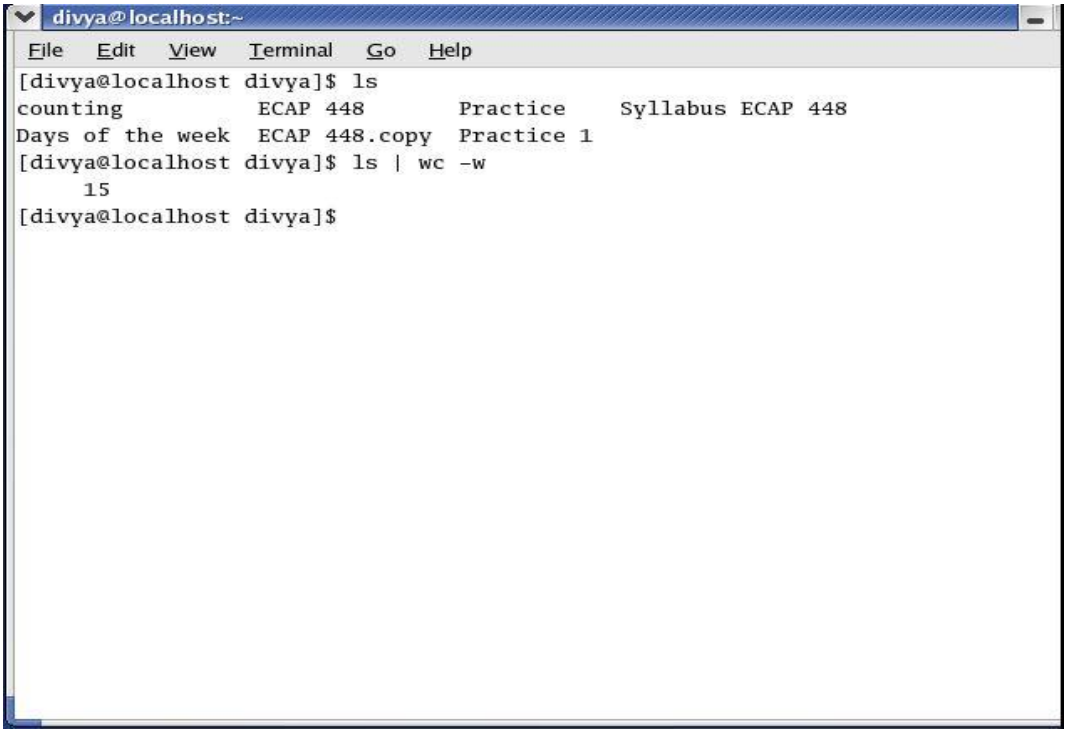
file: Identifies the Contents of a File

You can use the file utility to learn about the contents of a file without having to open and examine the file yourself.

| (Pipe): Communicates Between Processes

A process is the execution of a command by Linux. Communication between processes is one of the hallmarks of both UNIX and Linux. A pipe (written as a vertical bar [|] on the command line and appearing as a solid or broken vertical line on a keyboard) provides the simplest form of this kind of communication. Simply put, a pipe takes the output of one utility and sends that output as input to another utility.



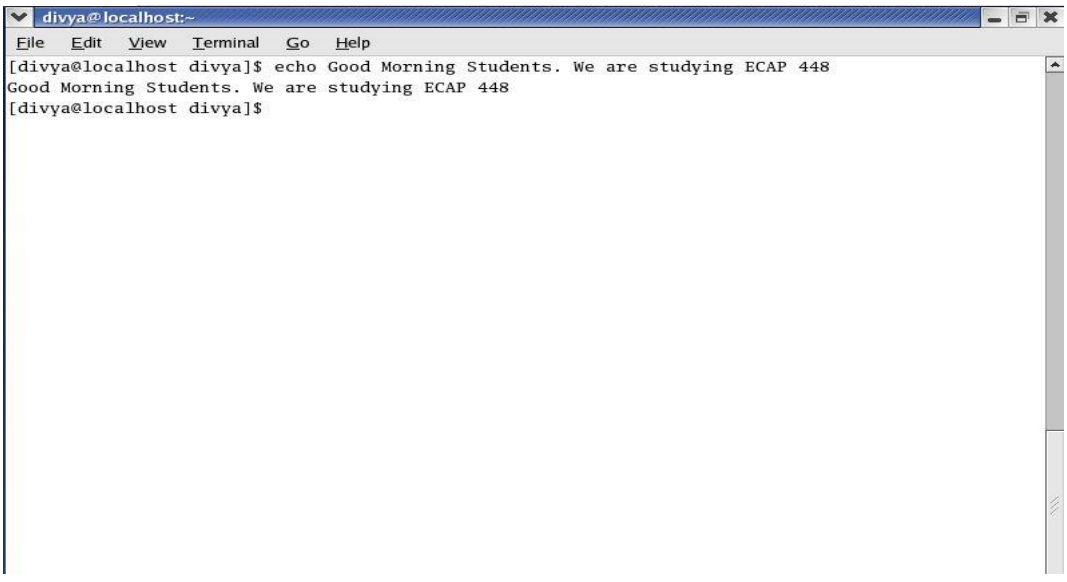


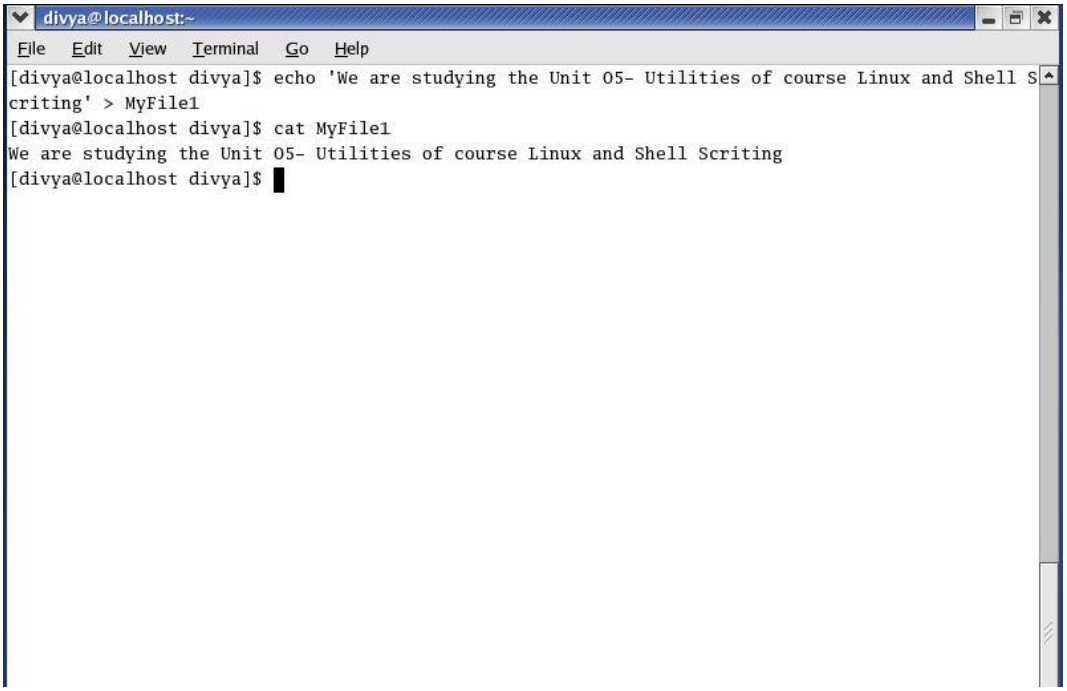
5.3 Four More Utilities

- echo
- date
- script
- unix2dos

echo: Displays Text

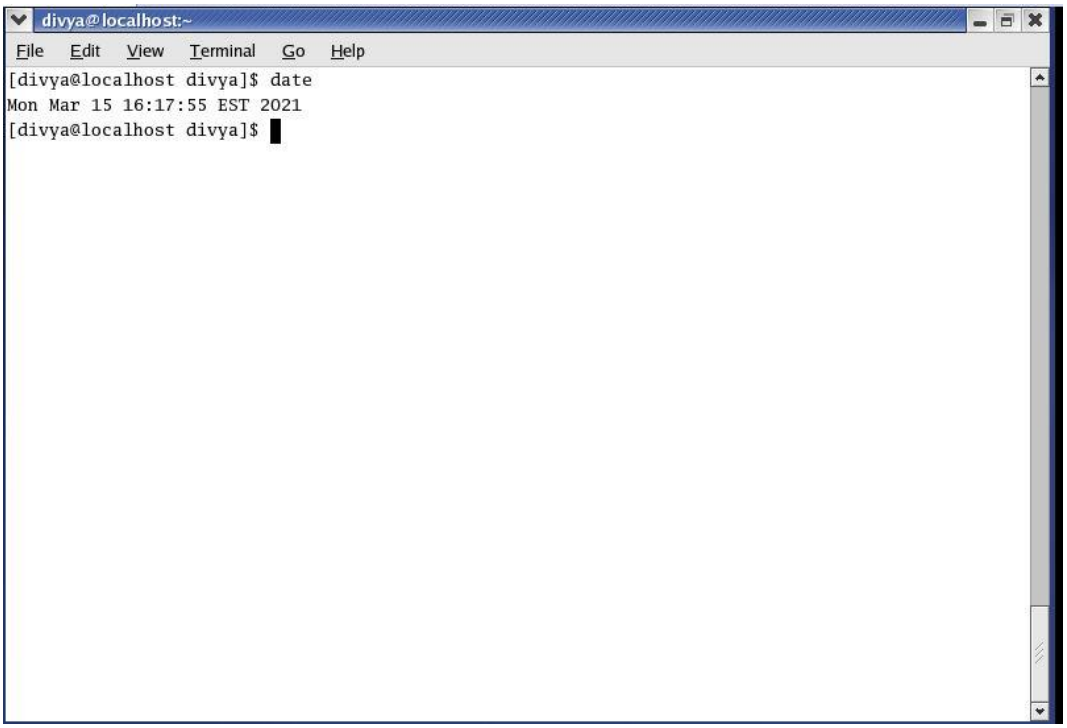
The echo utility copies the characters you type on the command line after echo to the screen. You can also send messages from shell scripts to the screen.

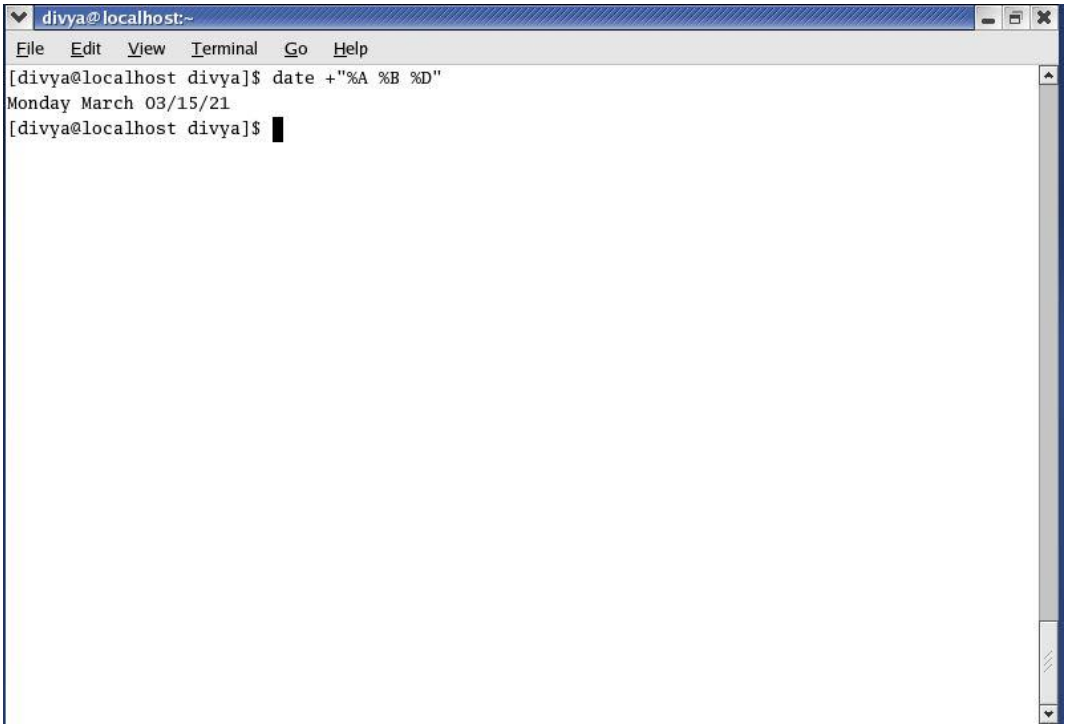




date: Displays the Time and Date

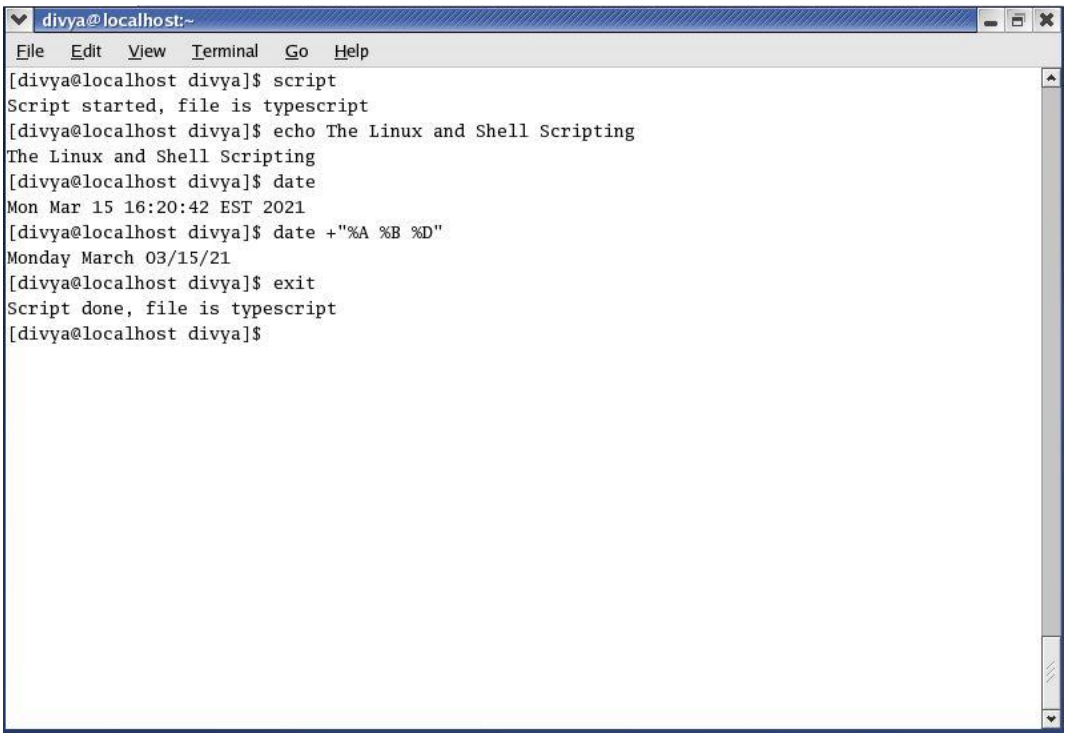
The date utility displays the current date and time. You can choose the format and select the contents of the output of date.

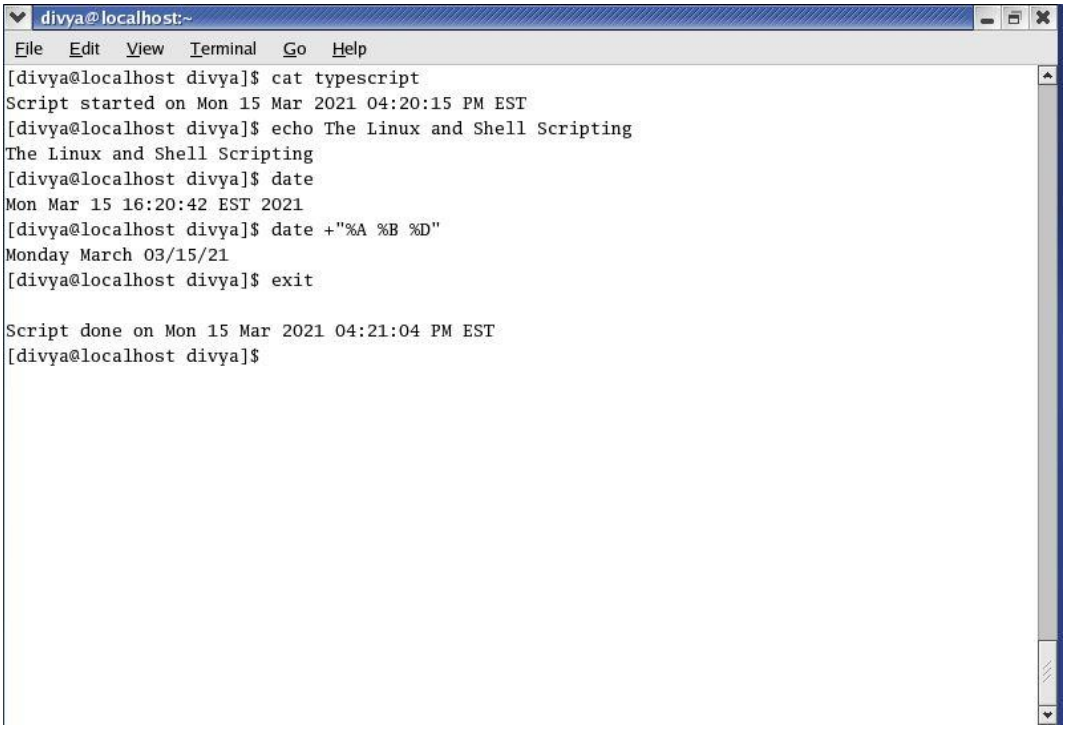




script: Records a Shell Session

The script utility records all or part of a login session, including your input and the system's responses. This utility is useful only from character-based devices. By default, script captures the session in a file named typescript. To specify a different filename, follow the script command with a SPACE and the filename





todos/unix2dos: Converts Linux Files to Windows Format

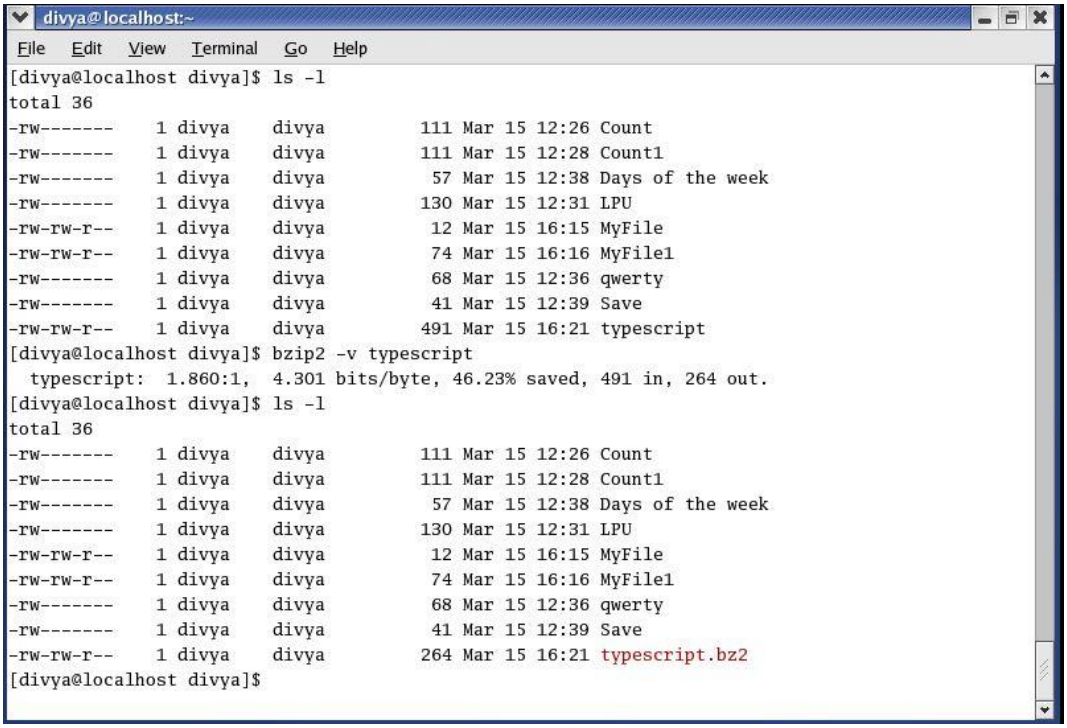
If you want to share a text file you created on a Linux system with someone on a system running Windows, you need to convert the file before the person on the other system can read it easily. The todos (to DOS; part of the tofrodos package) or unix2dos (UNIX to DOS; part of the unix2dos package) utility converts a Linux text file so it can be read on a Windows system. You can use the fromdos (from DOS; part of the tofrodos package) or dos2unix (DOS to UNIX; part of the dos2unix package) utility to convert Windows files so they can be read on a Linux system.

5.4 Compressing and Archiving Files

Large files use a lot of disk space and take longer than smaller files to transfer from one system to another over a network. If you do not need to look at the contents of a large file often, you may want to save it on a CD, DVD, or another medium and remove it from the hard disk. If you have a continuing need for the file, retrieving a copy from another medium may be inconvenient. To reduce the amount of disk space a file occupies without removing the file, you can compress the file without losing any of the information it holds. Similarly, a single archive of several files packed into a larger file is easier to manipulate, upload, download, and email than multiple files. You may download compressed, archived files from the Internet.

bzip2: Compresses a File

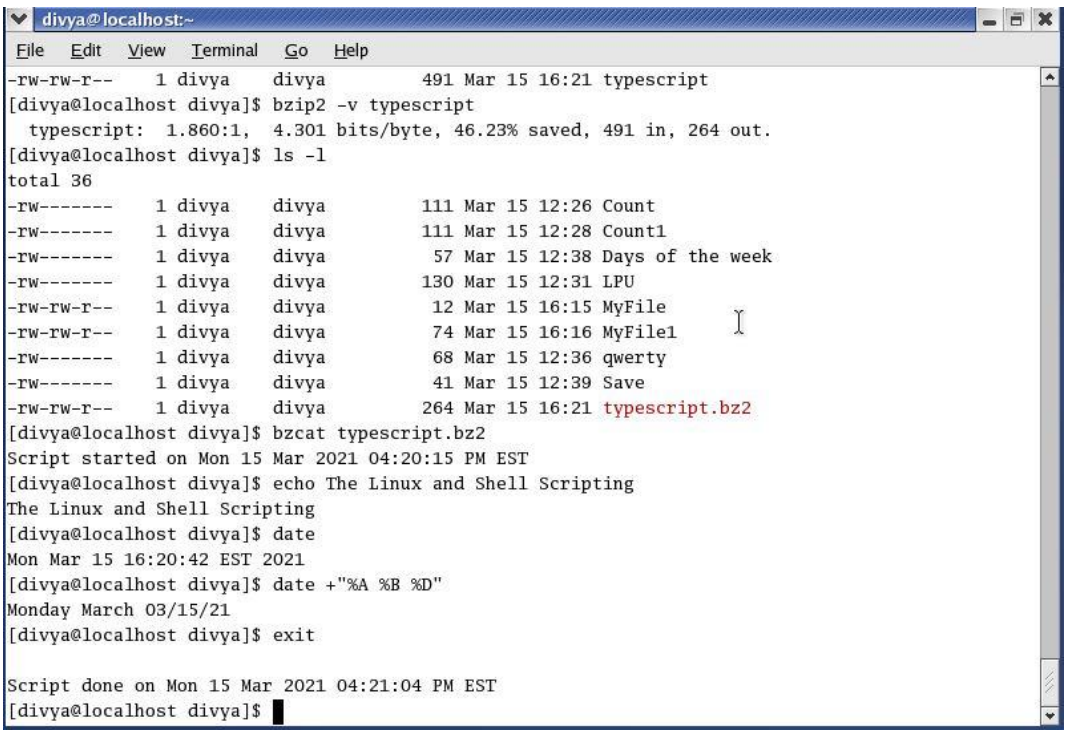
The bzip2 utility compresses a file by analyzing it and recoding it more efficiently. The new version of the file looks completely different. In fact, because the new file contains many nonprinting characters, you cannot view it directly. The –v (verbose) option causes bzip2 to report how much it was able to reduce the size of the file.



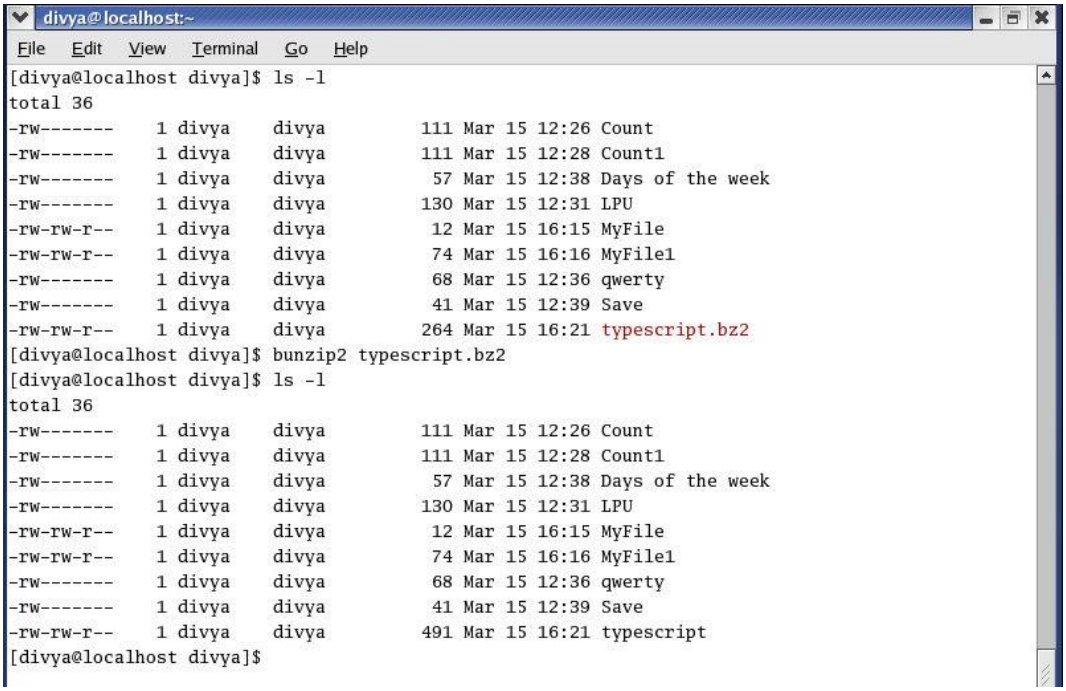
The bzip2 utility also renamed the file, appending .bz2 to its name. This naming convention reminds you that the file is compressed; you would not want to display or print it, for example, without first decompressing it.

bunzip2 and bzcat: Decompress a File

The bzcat utility displays a file that has been compressed with bzip2. The equivalent of cat for .bz2 files, bzcat decompresses the compressed data and displays the decompressed data. Like cat, bzcat does not change the source file.

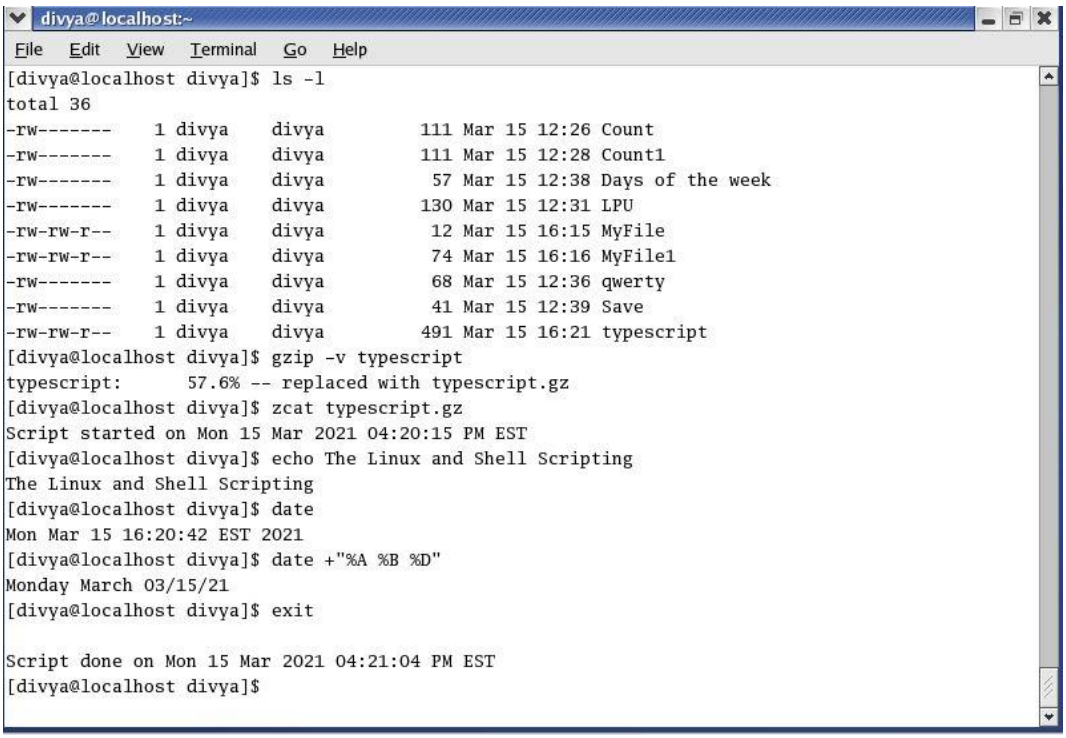


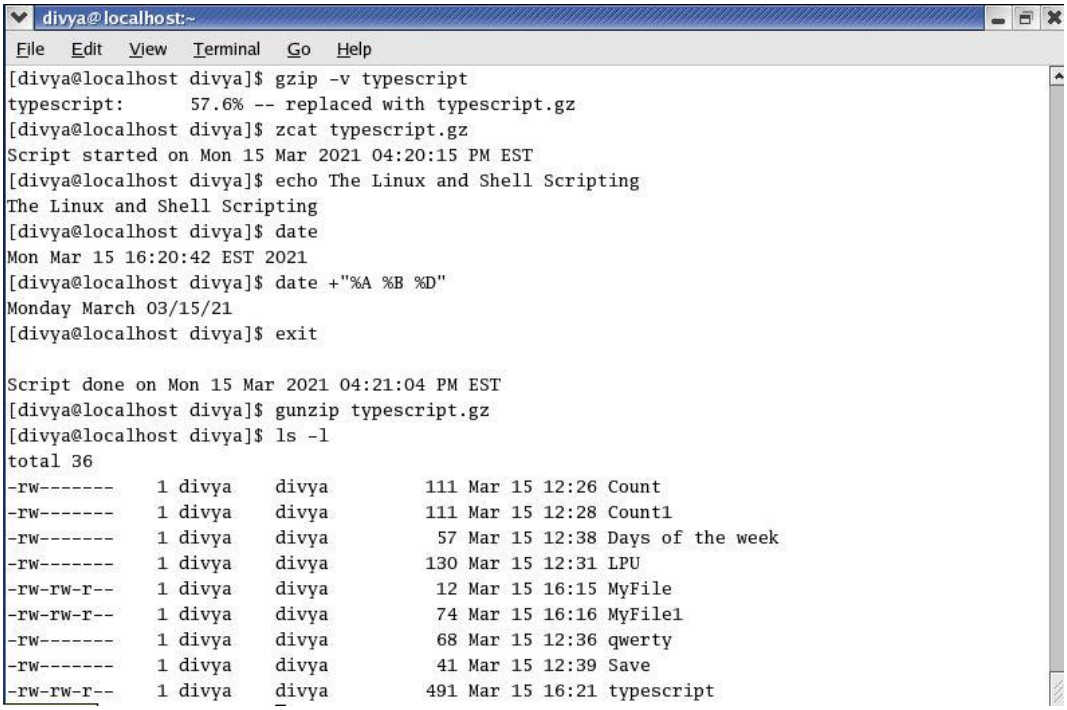
You can use the bunzip2 utility to restore a file that has been compressed with bzip2.



gzip: Compresses a File

The gzip (GNU zip) utility is older and less efficient than bzip2. Its flags and operation are very similar to those of bzip2. A file compressed by gzip is marked by a .gz filename extension. Linux stores manual pages in gzip format to save disk space; likewise, files you download from the Internet are frequently in gzip format. The gunzip utility to restore a file that has been compressed with gzip. zcat decompresses the compressed data and displays the decompressed data.

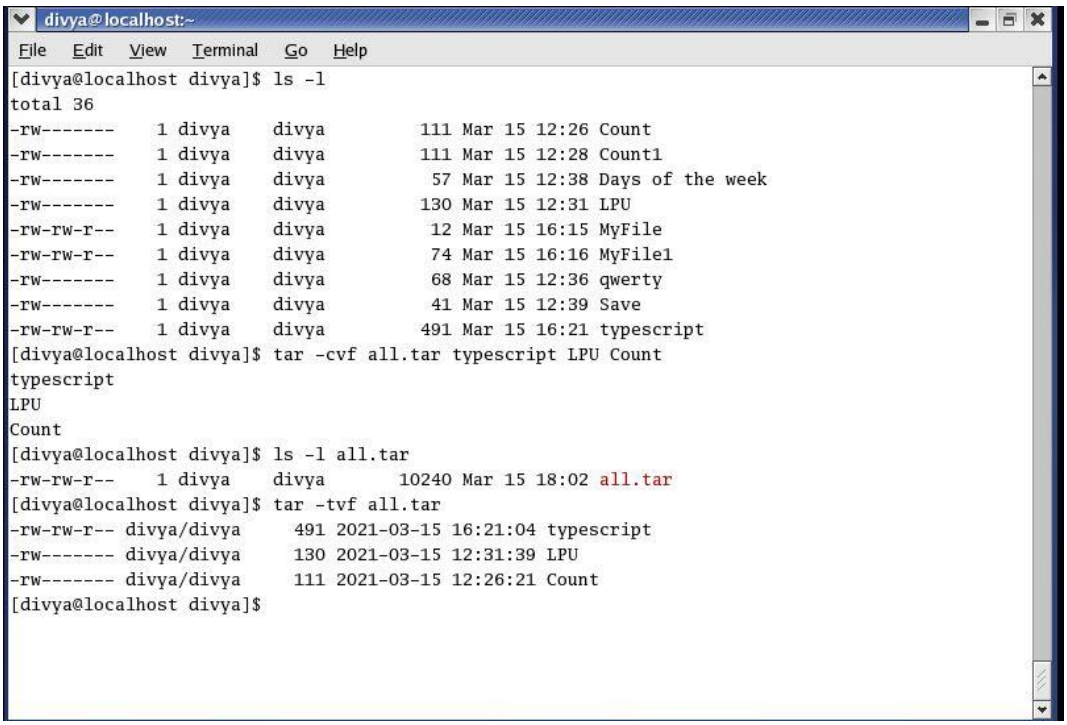




Do not confuse gzip and gunzip with the zip and unzip utilities. These last two are used to pack and unpack zip archives containing several files compressed into a single file that has been imported from or is being exported to a system running Windows.

tar: Packs and Unpacks Archives

The tar utility performs many functions. Its name is short for tape archive, as its original function was to create and read archive and backup tapes. Today it is used to create a single file (called a tar file, archive, or tarball) from multiple files or directory hierarchies and to extract files from a tar file.



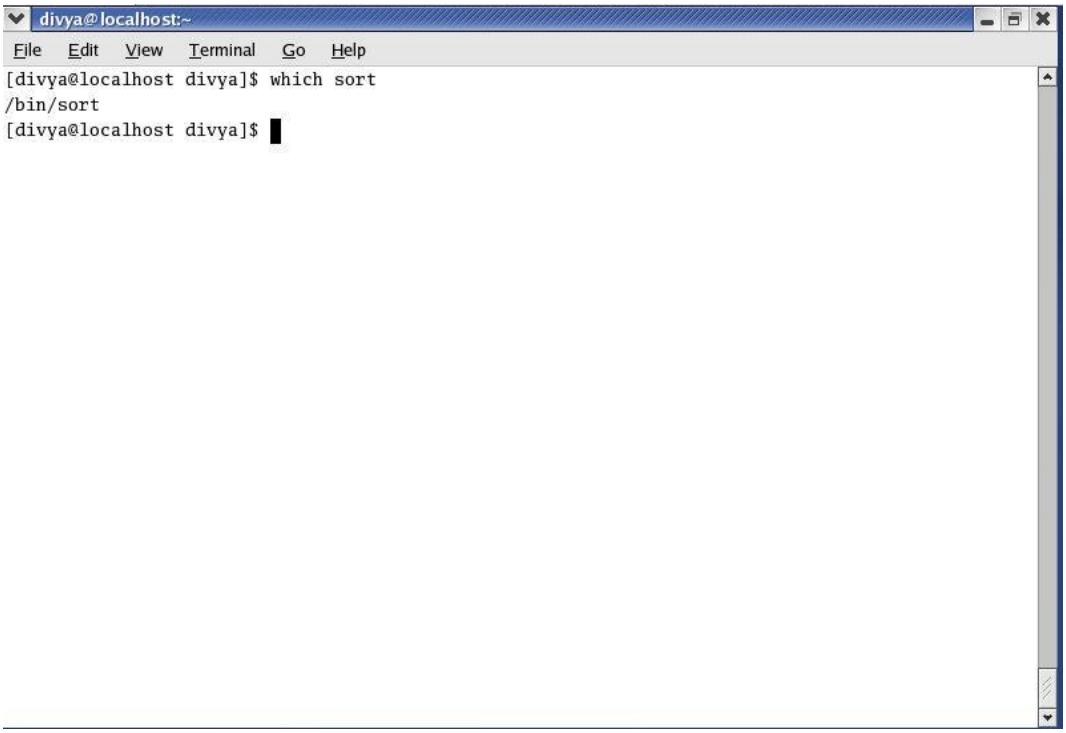
Tar uses the –c (create), –v (verbose), and –f (write to or read from a file) options to create an archive named all.tar from these files. Each line of output displays the name of the file tar is appending to the archive it is creating. The tar utility adds overhead when it creates an archive. The final command uses the –t option to display a table of contents for the archive. You can use bzip2, compress, or gzip to compress tar files, making them easier to store and handle. Many files you download from the Internet will already be in one of these formats. Files that have been processed by tar and compressed by bzip2 frequently have a filename extension of .tar.bz2 or .tbz. Those processed by tar and gzip have an extension of .tar.gz, .tgz, or .gz, whereas files processed by tar and compress use .tar.Z as the extension.

5.5 Locating Commands

The where is and locate utilities can help you find a command whose name you have forgotten or whose location you do not know. When multiple copies of a utility or program are present, which tells you which copy you will run. The slocate utility searches for files on the local system.

Which and where is: Locate a Utility

When you give Linux a command, the shell searches a list of directories for a program with that name and runs the first one it finds. This list of directories is called a search path. If you do not change the search path, the shell searches only a standard set of directories and then stops searching. However, other directories on the system may also contain useful utilities. The which utility locates utilities by displaying the full pathname of the file for the utility. The local system may include several utilities that have the same name. When you type the name of a utility, the shell searches for the utility in your search path and runs the first one it finds. You can find out which copy of the utility the shell will run by using which.

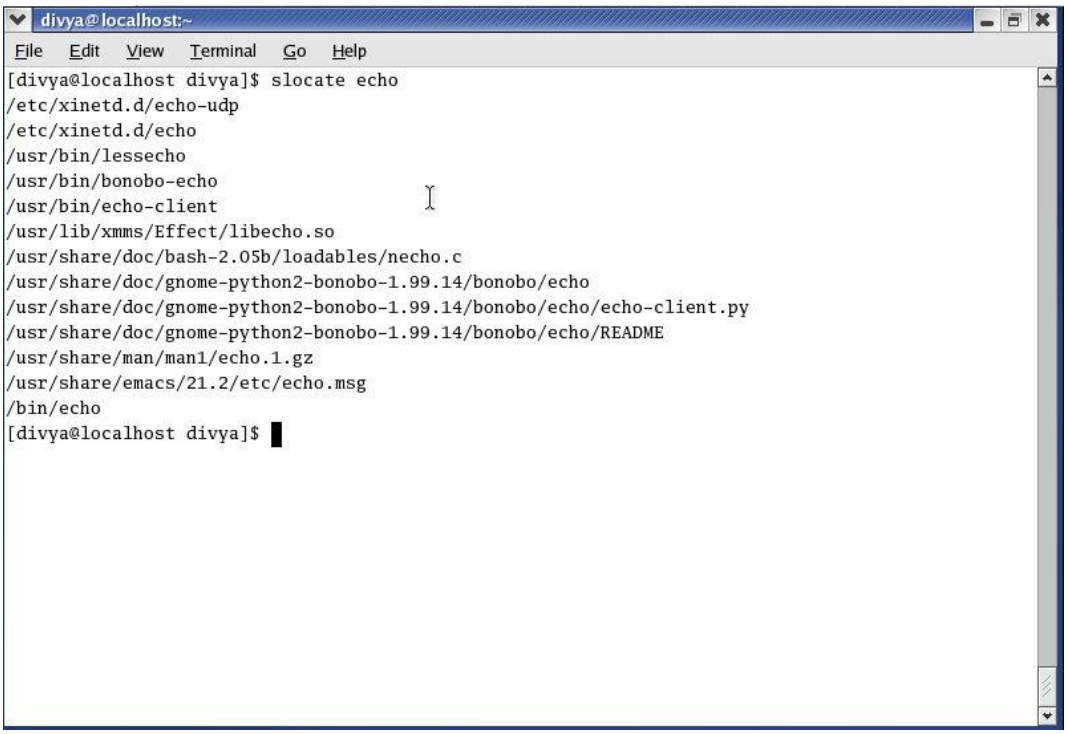


The where is utility searches for files related to a utility by looking in standard locations instead of using your search path.

Where is finds three references to sort: the sort utility file, a sort header file, and the sort man page.

slocate/locate: Searches for a File

The slocate (secure locate) or locate utility searches for files on the local system.



Summary:

- When you log in the system, you work in the home directory.

- When you want to view a file that is longer than one screen, you can use either the less utility or the more utility.
- If the destination-file exists before you give a cp command, cp overwrites it. The cp –i (interactive) option prompts you before it overwrites a file.
- If a file contains a list of names and has two successive entries for the same person, uniq skips the duplicate line.
- The diff utility with the –u (unified output format) option first displays two lines indicating which of the files you are comparing will be denoted by a plus sign (+) and which by a minus sign (–).
- You can use the file utility to learn about the contents of a file without having to open and examine the file yourself.
- By default script captures the session in a file named typescript. To specify a different filename, follow the script command with a SPACE and the filename
- The todos (to DOS; part of the tofrodos package) or unix2dos (UNIX to DOS; part of the unix2dos package) utility converts a Linux text file so it can be read on a Windows system.
- Linux stores manual pages in gzip format to save disk space; likewise, files you download from the Internet are frequently in gzip format.
- The gunzip utility to restore a file that has been compressed with gzip.
- The whereis and slocate utilities can help you find a command whose name you have forgotten or whose location you do not know.

Keywords

- **Directory:** A directory is a resource that can hold files. On other operating systems, like Windows, a directory is referred to as a folder.
- **ls:** The ls utility lists the names of files which are available.
- **cat:** The cat utility displays the contents of a text file.
- **rm:** The rm (remove) utility deletes a file.
- **cp:**: The cp (copy) utility makes a copy of a file. This utility can copy any file, including text and executable program (binary) files.
- **mv**: The mv (move) utility can rename a file without making a copy of it.
- **grep:** The grep utility searches through one or more files to see whether any contain a specified string of characters.
- **sort**: The sort utility displays the contents of a file in order by lines; it does not change the original file.
- **diff:** The diff (difference) utility compares two files and displays a list of the differences between them.
- **uniq**: The uniq (unique) utility displays a file, skipping adjacent duplicate lines, but does not change the original file.
- **Pipe:** A pipe (written as a vertical bar [|] on the command line and appearing as a solid or broken vertical line on a keyboard) provides the simplest form of this kind of communication.
- **echo:** The echo utility copies the characters you type on the command line after echo to the screen.
- **date**: The date utility displays the current date and time.

- **script:** The script utility records all or part of a login session, including your input and the system's responses.
- **bzip2:** The bzip2 utility compresses a file by analyzing it and recoding it more efficiently.
- **bzcat:** The bzcat utility displays a file that has been compressed with bzip2.
- **bunzip2**: You can use the bunzip2 utility to restore a file that has been compressed with bzip2.
- **whereis**: The whereis utility searches for files related to a utility by looking in standard locations instead of using your search path.
- **slocate:** The slocate (secure locate) or locate utility searches for files on the local system.

Self Assessment

1. Which of these utilities is used to convert a Linux text file so that it can be read on a Windows system?

A. todos
B. dos2unix
C. echo
D. script

2. Which of these utilities records a shell session?

A. echo
B. date
C. script
D. cat

3. Which of these is not used in Linux System?

A. zip
B. bzip2
C. bunzip2
D. zcat

4. Which of these utilities is used to compress a file?

A. bzip2
B. bunzip2
C. gunzip
D. zcat

5. Which of these utilities records a shell session?

A. echo
B. date
C. script
D. cat

6. In less/more, which of these keys should be pressed to display the next screen?

A. SPACE
B. ENTER
C. CTRL
D. ALT

7. Which of these utilities removes duplicate lines from a file?
A. grep
B. uniq
C. sort
D. None of the above

8. Which option with rm provides the interactive deletion?
A. -i
B. -a
C. -b
D. -r

9. Which of these utilities are used when you want to view a file that is longer than one page?
A. more
B. less
C. Both more and less
D. None of the above

10. Which of these utility displays the contents of a text file?
A. ls
B. cat
C. rm
D. All of the above mentioned

11. Which of these utilities displays the names of files that are available?
A. ls
B. cat
C. rm
D. All of the above mentioned

12. Which of these utilities compares two files and display the difference between them?
A. grep
B. uniq
C. diff
D. differ

13. Which symbol is used for representation of a pipe?

A. #
B. $
C. |
D. &

14. Which of these represents the basic utilities in Linux?
A. ls
B. cat
C. rm
D. All of the above mentioned

15. When you log in a Linux system, you work in _____ directory
A. root
B. home
C. var
D. None of the above

Answers for Self Assessment

1.	A	2.	C	3.	A	4.	A	5.	C
6.	A	7.	C	8.	A	9.	C	10.	B
11.	A	12.	C	13.	C	14.	D	15.	B

Review Questions:

1. What is command line utilities? Give some examples and explain the usage of few basic utilities.
2. Which basic utility is used to delete a file? How can we make it interactive?
3. What are pager utilities? How these are useful?
4. Which utilities are used to work with files? Explain any five utilities in detail.
5. Explain the use and syntax of echo, date and script utilities.
6. What is compressing and archiving of files? Explain the utilities used for it.
7. Explain what are locating commands?

Further Readings

Mark G. Sobell, A Practical Guide to Fedora and Red Hat Enterprise Linux, Fifth Edition, Pearson Education

Web Links

https://www.javatpoint.com/linux-commands