1.4. Layers of LINUX/UNIX

- LINUX/UNIX has three most important parts.
  They are Kernel, Shell and File System

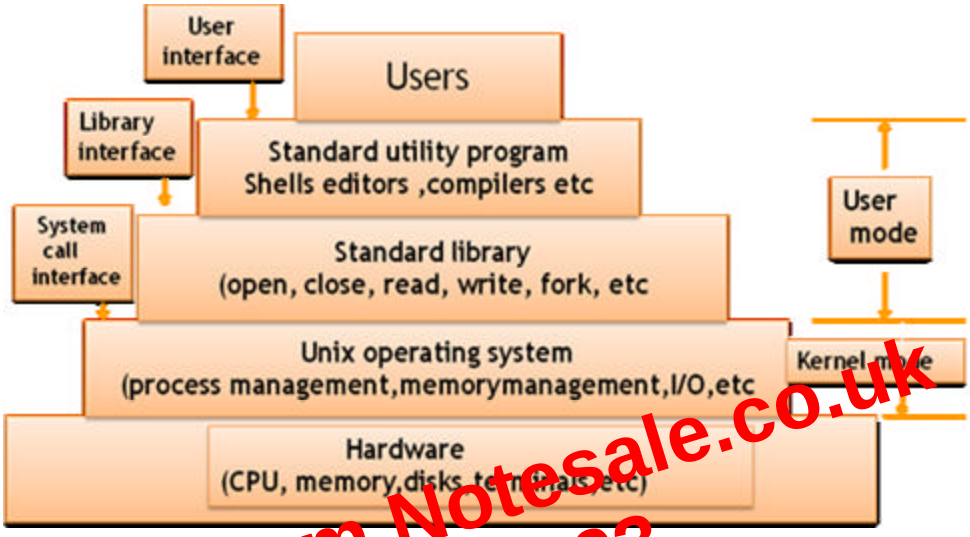

Fig 1.1 Layers of Linux

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1.4.1 Kernel:

- Kernel is the heart of the operating system.
- It is the low level core of the System that is the interface between applications and H/W.
- Functions
  - Manage Memory, I/O devices, allocates the time between user and process, inter process communication, sets process priority

1.4.2 Shell:

- The shell is a program that sits on the as an interface between users and kernel
- It is a command interpreter and also has programming capability of its own.
- Shell Types
  - Bourne Shell (sh) (First shell by Stephen Bourne)
  - C Shell(sh)
  - Korn Shell (ksh)
  - Bourne Again Shell(bash)

2. Getting Started

- Use username and password for login.
- Login is user unique name.
- Linux is case sensitive.
- Password can be changed by the user at any time.

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Command: **top**

- To view the CPU usage of all processes.
- Syntax:**$ top**

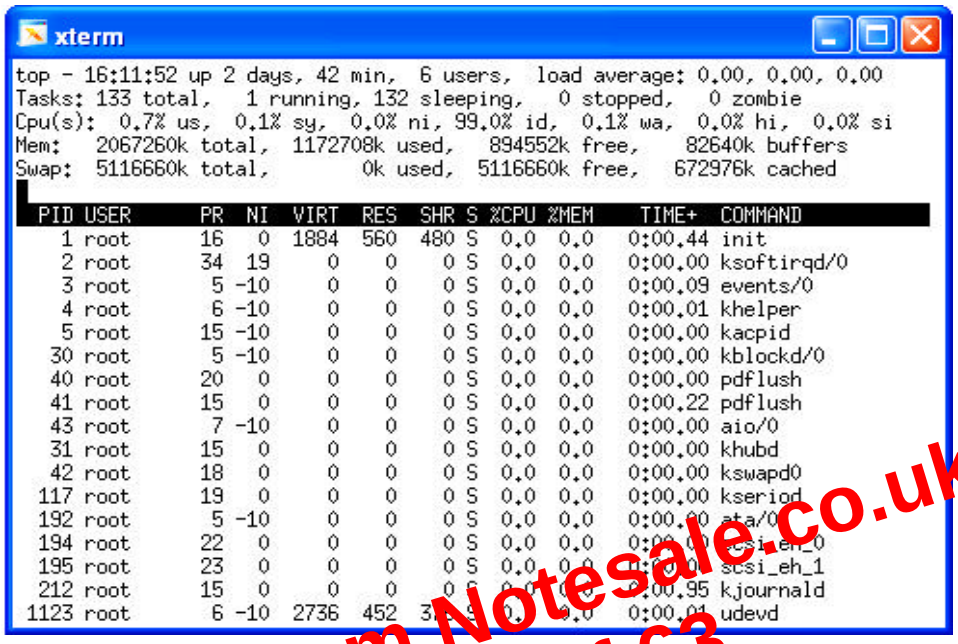

Fig. 3.14 top command

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4 File System

- ❖ Linux files are organized by a hierarchy of labels, commonly known as hierarchy structure.
- ❖ There are three types of files.
- ❖ They are

  - ➢ Regular Files:
    - This contains a sequence of bytes that generally corresponds to code or data.

  - ➢ Directory Files:
    - Directory file contains an entry for every file and subdirectory that it is placed.

  - ➢ Device Files:
    - These files correspond to the printers or other devices connected to the system.

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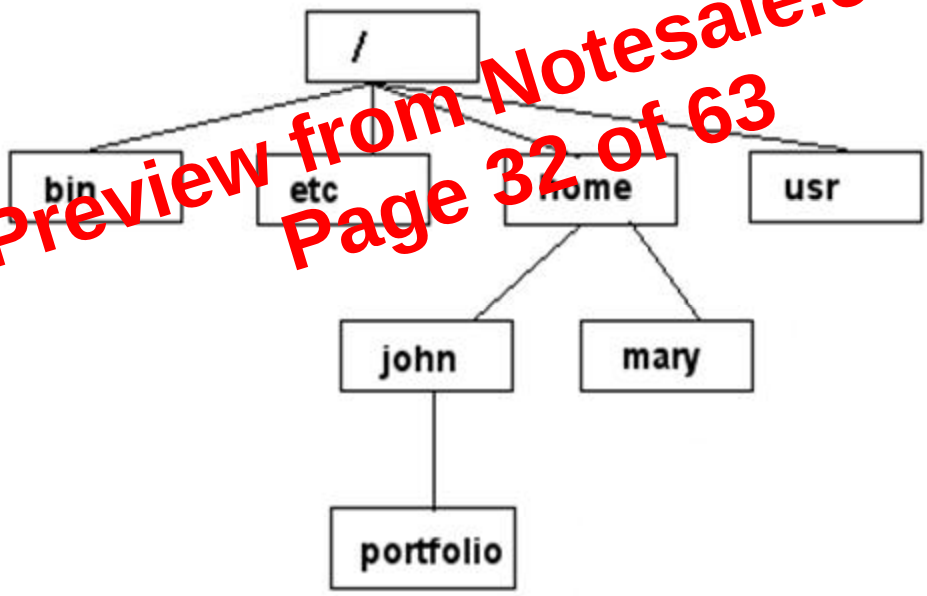

Fig. 4.1File System

4.1 Directories in LINUX:

- Directory: /bin
  /bin contains the binaries which are needed to run LINUX.

- Directory: /boot
  /boot has all the files required for booting LINUX on system.

- Directory: /dev
  /dev has the devices for all the files.

- Directory: /etc
  /etc contains the configuration files of the various software.
  Normally no one touch this directory.

- Directory: /home
  /home is like My Documents in Windows.
  This contains the username as the sub directory.

- Directory: /lib
  /lib contains the libraries required for the system files.

- Directory: /lost+found
  /lost+found contains the files which are damaged or which are not linked to any directory
  These damages are due to the incorrect shutdown.

- Directory: /mnt
  This is the directory in which we mount the devices and other file systems.

- Directory: /opt
  Here the optional softwares are installed.

- Directory: /root
  The directory for the user root

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Command: **sort**

- It prints the lines of the file in sorted order.
- Syntax:
  $ sort filename

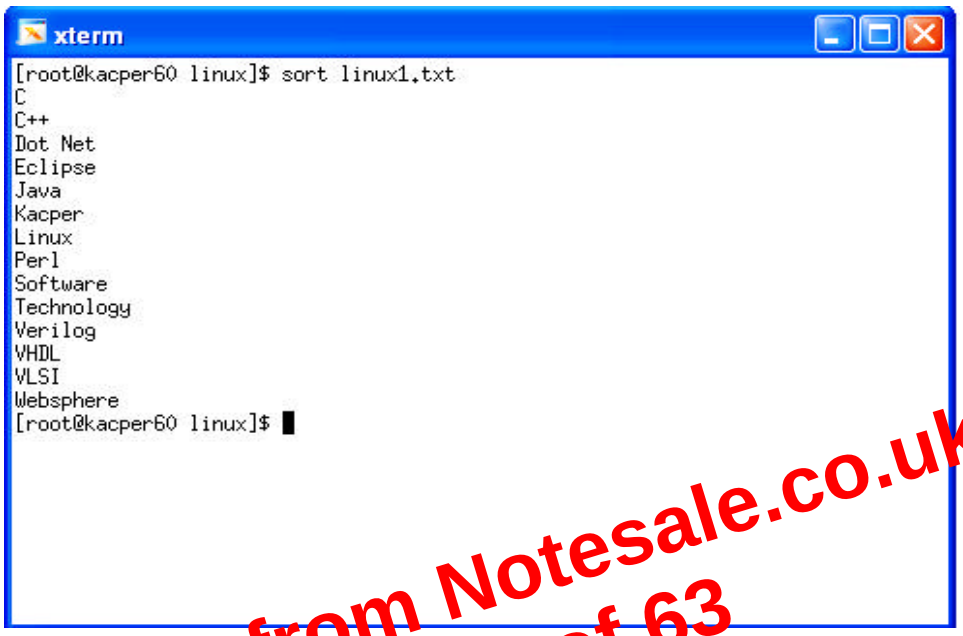

Fig. 4.5 sort command

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6. Shell Scripting

6.1Scripting:

- Shell scripting provides the solution to a task as a combination of the UNIX utilities.
- Here pipes and file handling are used to connect subtasks.
- Scripting uses advanced utilities such as sort, cut, paste, join, grep, sed, awk, etc.

6.2 Utilities:

6.2.1Sort:

- Sort records in file and the order default is ascending dictionary order.
- The available options for sort are

-t	Field separator
-k	Field to sort by
-n	Use numeric order
-r	Reverse direction

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6.2.2 Join:

- Join combines two files based on value of common field.
- It's similar to join operation in relation algebra.
- The available options are

-1	Field to join on first file
-2	Field to join on second file
-t	Field separator

7.5 File Descriptors:

- The file descriptor has 3 standard file descriptors.
- They are
  - Stdin, Standard input to the program.
  - Stdout, Standard output from the program.
  - Stderr, Standard error output from the program.

- The file redirections are listed below:

>	Output redirect
>!	Output redirect but overrides noclobber option of csh
>>	Append output
>>!	Append output but overrides noclobber option of csh and creates the file if it doesn't already exist
|	Pipe output to another command
<	Input redirection

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7.9.1.1 Cursor Movement:

- Arrow keys are used for the movement.
- Alternative keys used for the cursor keys are **h** for left, **j** for down, **k** for up and **l** for right.
- **^f** forward one screen.
- **^b** back one screen.
- **^d** down half screen.
- **^u** up half screen.
- **G** go to the last line of the file.
- **$** end of the current file.
- **0** beginning of the current line.
- **e** end of the word.

7.9.1.2 Inserting the Text:

- **i** insert text before the cursor.
- **a** append text after the cursor.
- **I** insert text at begging of the line.
- **A** append text at the end of the line.
- **o** open new line after current line.
- **O** open new line before current line.

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7.9.1.3 Deleting the Text:

- **dd** deletes the current line.
- **D** deletes from cursor to the end of line.
- **X** deletes the current character.

7.9.1.4 File Manipulation:

:w	Write changes to file
:wq	Write changes and quit
:w!	Force overwrite of file
:q	Quit if no changes made
:q!	Quit without saving changes
:!	Shell escape
:r!	Insert result of shell command at cursor position

Command: ssh

- **ssh** (Secure SHell) is a program for logging into a remote machine and for executing commands on a remote machine.
- Syntax**: $ssh [-l login_name] hostname**
- Exampl: **$ssh ip address**

  We can connect to that particular system

Command: netstat

- netstat are used to check the connectivity of the network.
- Commad:

  $ netstat –rn

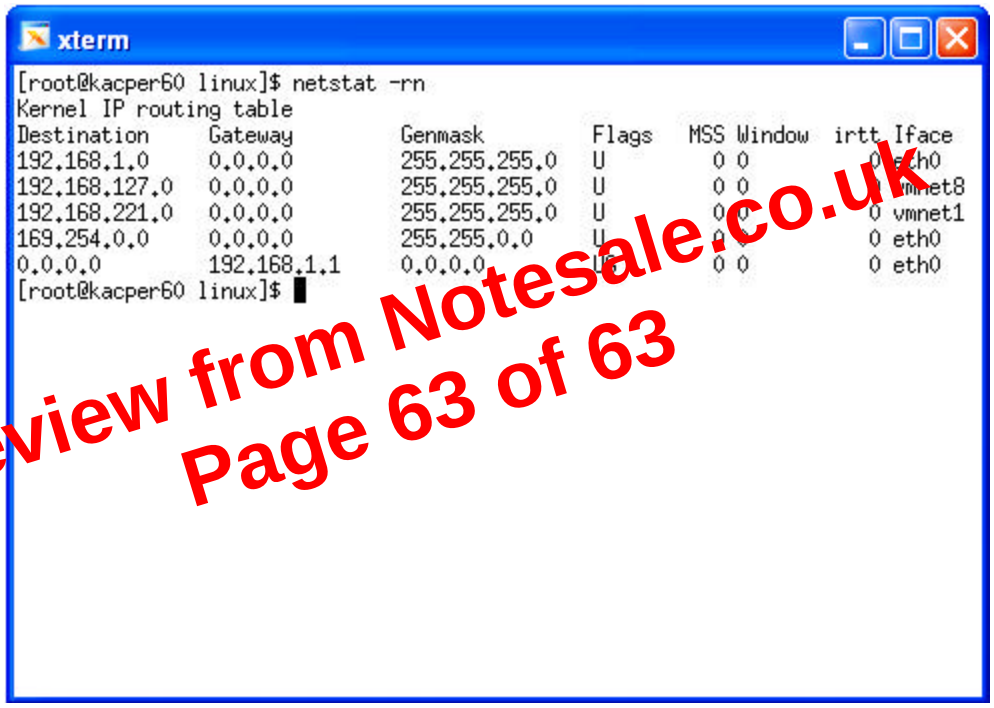

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Fig. 9.3 netstat command