LINUX

What is Operating System ?

Operating system is an interface between user and the computer hardware.

The hardware of the computer cannot understand the human readable language as it works on binaries i.e. 0's and 1's.

Also it is very tough for humans to understand the binary language, in such case we need an interface

Which can translate human language to hardware and vice-versa for effective communication.

Types of Operating System:

Single User - Single Tasking Operating System
Single User - Multitasking Operating System
Multi User - Multitasking Operating System

Single User - Single Tasking Operating System(MS-DOS)

Single User - Multitasking Operating System(windows)

Multi User - Multitasking Operating System(unix,linux)

1. UNIX Principles
2. **Everything is a file**:- UNIX system have many powerful utilities designed to create and manipulate files. The UNIX security model is based around the security of files. By treating everything as a file, you can secure access to hardware in the same way as you secure access to a document.
3. **Configuration data stored in text**: - Storing configuration in text allows an administrator to move a configuration from one machine to another easily, provide the ability to roll back a system configuration to a particular date and time.
4. **Small, Single-Purpose Programs**: - UNIX provides many utilities.
5. **Avoid captive user interfaces**:-
6. **Ability to chain programs together to perform complex tasks**:- A core design feature of UNIX is that output of one program can be the input for another. This gives the user the flexibility to combine many small programs together to perform a larger, more complex task.

Why Linux?

Fresh implementation of UNIX APIs

Open source development model

Supports wide variety of hardware

Supports many networking protocols and Configurations

Fully supported

Basic Commands

* mkdir myfolder : for creating folder
* mkdir -p maha/{1/{a,b},2/{a,b}} : for creating nested folders
* tree : By using this command, we can see folders in tree wise
* touch : to create empty files
* vi : it is editor to create date files
* nano : to create date files
* cat : we can see file date
* cat > f1 : to create files
* cat >> f1 : we add data in same file at end
* cp <source file> < destination directory/file>

* cp -rvfp <source directory name> <destination directory name>
* mv <filename> <destination directory name> : cut & paste
* mv <old filename> <new filename> : rename file
* mv <old dir name> <new dir name> : rename dir

* cmp file1 file2
* diff file1 file2
* rm filename
* rm -f filename without prompting
* rmdir <directory name>
* rm -rf <directory name>
* hostname : get host name
* uname : type machine
* uname -a : version , proces

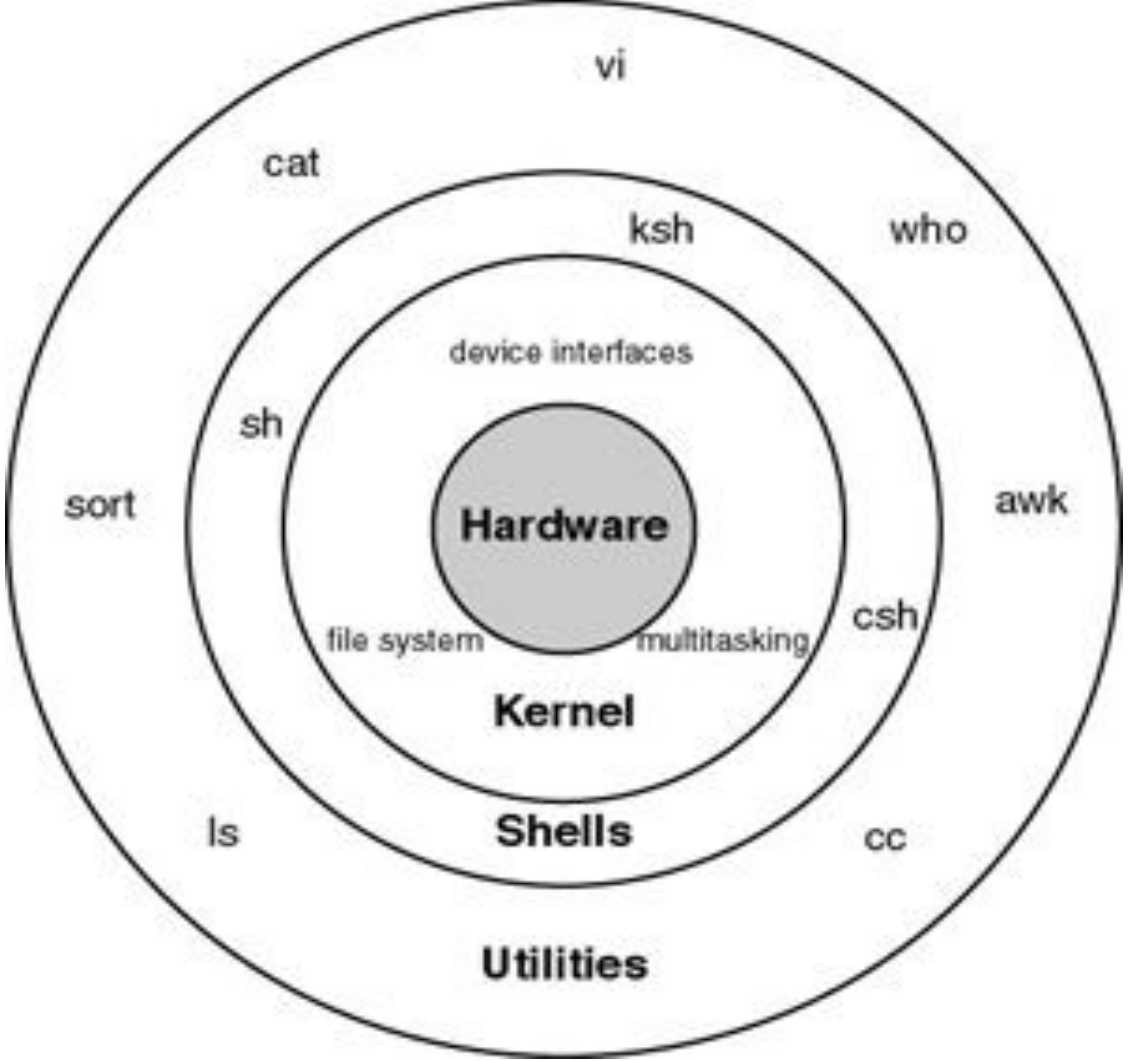
* top : to display cpu load
* date : to display date
* ps
* who | wc -l : how many users logged
* whoami : who logged in

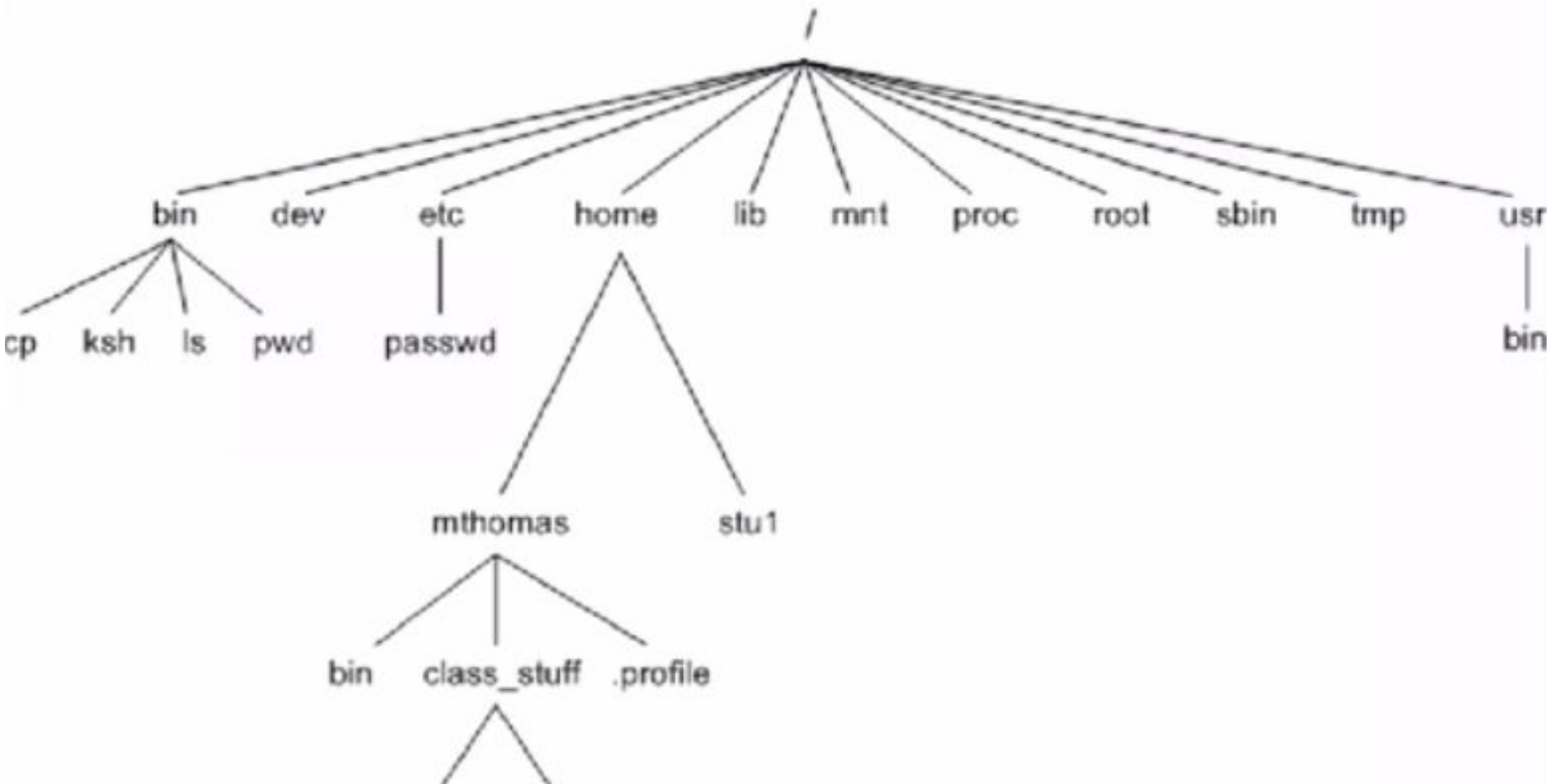
df -f : to see mount points

fdisk -l : to see devices

free -h : to check memory.

UNIX Architecture




/
bin
dev
etc
home
lib
mnt
proc
root
sbin
tmp
usr
cp
ksh
ls
pwd
passwd
bin
mthomas
stu1
bin
class_stuff
.profile

FILESYSTEM HIERARCHY SYSTEM

Linux uses single rooted, inverted tree like file system hierarchy

/

- This is top level directory
- It is parent directory for all other directories
- It is called as ROOT drive
- It is represented by forward slash (/)
- C:\ of windows

/root

- it is home directory for root user (super user)
- It provides working environment for root user
- C:\Documents and Settings\Administrator

/home

- it is home directory for other users
- It provide working environment for other users (other than root)
- c:\Documents and Settings\username

/boot

- it contains bootable files for Linux
- Like vmlinuz (kernel)..... ntoskrnl
- Initrd (INITial Ram Disk)and
- GRUB (GRand Unified Boot loader).... boot.ini, ntldr

/etc

- it contains all configuration files
- Like /etc/passwd..... User info
- /etc/resolv.conf... Preferred DNS
- /etc/dhcpd.conf.... DHCP server

/usr

- by default softwares are installed in /usr directory
- (UNIX Sharable Resources)
- c:\program files

/opt

- It is optional directory for /usr
- It contains third party softwares
- c:\program files

/bin

- it contains commands used by all users
- (Binary files)

/sbin

- it contains commands used by only Super User (root)
- (Super user's binary files)

/dev

- it contains device files
- Like /dev/hda ... for hard disk
- /dev/cd rom ... for cd rom
- Similar to device manager of windows

/proc

- it contain process files
- Its contents are not permanent, they keep changing
- It is also called as Virtual Directory
- Its file contain useful information used by OS
- like /proc/meminfo ... information of RAM/SWAP
- /proc/cpuinfo ... information of CPU

/var

- it is containing variable data like mails, log files

/mnt

- it is default mount point for any partition
- It is empty by default

/media

- it contains all of removable media like CD-ROM, pen drive

/lib

- it contains library files which are used by OS
- It is similar to dll files of windows
- Library files in Linux are SO (shared object) files

Filter commands

#less

#more

#head

#tail

#sort

#cut

#sed

less /etc/passwd : see the output line wise or page wise.

Use d to go to next page

Use b to go to previous page

Use / to search for a word in the file

Use v to go vi mode

#more /etc/passwd : scroll down line by line

press Enter key to scroll down line by line (or)

Use d to go to next page

Use / to search for a word in the file

Use v to go vi mode

head /etc/passwd : display the top 10 lines of the file.

head -5 /etc/passwd : display the top 5 lines of the file.

#tail /etc/passwd : display the last 10 lines of the file

#tail -5 /etc/passwd : display the last 5 lines of the file

#sort <filename> : output in numeric or alphabetic order

#sort -h <filename> : To sort the file according to numbers

#sort -u <filename> : To remove the duplicate entries from the output

#cut -d ':' -f 3 /etc/passwd : The cut command is used to pick the given expression (in columns) and display the output

#cut –d " " –f 1 filename : To delimit spaces and print the field

#sed : it will only modify the output, but there will be no change in the original file

#sed 's/searchfor/replacewith/g' filename

Regular Expressions, Pipelines & I/O Redirections

Grep:

grep root /etc/passwd : pick out info about "root" word

#grep -i <name> <file name>

#grep -nA2 <name> /etc/group : To display a word and 2 lines after the word:

#grep -nB2 <name> /etc/group : To display a word and 2 lines before the word

#grep -v <name> /etc/group : To display the things except the given word

Find commands:

find command is used to find the files or directories path, it is exactly like the find option in windows where you can search for a file

#find / -name <filename> : For searching a file with its name

#find / -name myTech

#find / -inum <inum> : For searching a file with particular inode number

#find / -inum 5934

#find / -type < filetype> : For searching a particular type of file

#find . -type f -mtime -2 -size -10M

#find / -user < username> : For files whose owner is a particular user

#find / -user myuser

#find / -group < group name> : For files belonging to particular group

#find / -group mygroup

#cpm file1 file2 : first change only display

#diff file1 file2 : display all changes in same page

`

File create:

#touch

vi

cat >, >>

nano

redirect

I/O Redirection:

Using > or >> filename after the command, and

Using tee command

#cat file1 file2 > file3 : Copying contents of two files in a new file

cat f1 >> f3

#cat <filename> | tee <new file name> : will not only redirect the output to new file but it will also display the output.

cat f3 | tee f4