Assignment X

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Name:A.Venkata Sai Mahesh
Date:02/12/2019
Signature: Venkata Sai Mahesh Abburi

Section 1 :

The technical differences between various Linux systems are file locations, software versions, package management systems.

Red Hat Family	**SUSE Family**	**Debian Family**
Upstream testing platform for RHEL	SLES is upstream for OpenSUSE	Upstream for Ubuntu
Kernel Version 3.10 is used	Kernel version 4.12 is used	Kernel version 4.15 is used
Uses RPM based yum package manager	Uses RPM based zypper package manager	Uses DPKG-based APT package manager
Widely used by Enterprises	Widely used in retail and other sectors	Widely used in cloud deployments

Section 2 :

History : In 1991, a college finished student Linus torvalds started a project of writing his own operating system kernel which got re-licensed in 1992 using GPL(General public license) by GNU and came to be known as Linux.
Philosophy : Linux was inspired by UNIX.In this, the files are stored in a hierarchical fashion with root as it's top node.
Community : Linux community consists of a system administrators, users, vendors which are connected to each other by various forums.

Terminology : The most common terms to be aware of while using linux are kernel, distributions, file system, service, boot loader, command line, desktop environment, shell.
Distribution : A perfect linux distribution consists of a kernel and other software packages for managing file systems

Section 3 :

Boot Process : The procedure for initializing the system is called boot process.

BIOS : It initialises the hardware and tests the main memory which is called as POST(Power on self test). Is stored in a ROM chip.

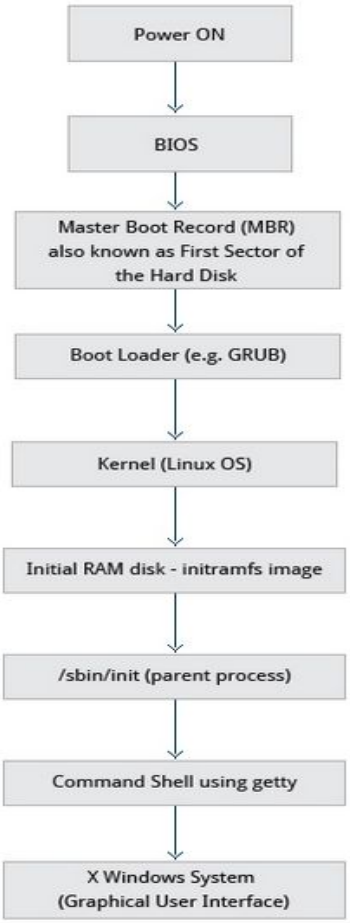
MBR : After finding Bootable partition it searches for GRUB and loads it into RAM. It's is of 512 Bytes size.

GRUB : Presents user interface of choosing Linux or other operating systems installed. The kernel of OS selected is loaded into RAM

Kernel : Uncompress itself, analyze and initialize system hardware device drivers.

Initial RAM disk : The initramfs image mounts the root file system. After that init program gets executed.

- As Each stage requires a process of completing the before stage, startup didn't take advantage of parallel processing.
- Systems with systemd startup takes less time than init process as it can initiate multiple services simultaneously.



The Boot Process

Section 4 :

- For logging into graphical interface from command line we can use startx commands.
- GNOME and KDE are the two popular GUIs that runs on top of Linux.
- gdm is the default display manager of GNOME
- GNOME-tweaks-tool give the exposure of many more settings
- The default text editor of GNOME is gedit
- Linux allows to switch between users
- Some of the shortcuts in Linux are
    - Ctrl + L- directory location
    - Super + L - Lock screen
    - Alt + F2 - Enter a command
    - Ctrl 1 or Ctrl 2 - Switching between list view and Tile view

- Ctrl+H - Show hidden icons
- Nautilus - opens file manager
- Ctrl + F - search text box
- Ctrl + Delete - Delete temporarily(moving to trash)
- Shift + Delete - Delete permanently

Section 5 :

- NTP protocol is the most popular protocol used for setting local time through internet servers
- All the details of your graphical interface can be obtained by typing xdpyinfo command in terminal.
- Network manager was developed for easier use of network configuration files which uses DHCP protocol.
- Debian distribution uses dpkg and apt utilities for package management

Section 6 :

- Linux supports both graphical and text based web browsers
- Most email clients use the IMAP or POP protocols to access email on a remote mail server
- Libreoffice is the default office of linux which includes
  - Writer
  - Calc
  - Impress
  - Draw
- GIMP is the featured photoshop tool that is available in all linux distributions

Section 7 :

- Virtual terminals can be launched and switched by pressing the Ctrl + Alt + Function keys together. For switching from one VT to other Alr + F6 is sufficient
- We can also log into remote systems via Secure Shell(SSH) utility

Command	Utility
sudo telinit 3 (or) sudo systemctl stop gdm	Stops GUI
Sudo telinit 5(or) sudo systemctl start gdm	Starts GUI
Shutdown -r	reboot
Shutdown -h	poweroff
which diff,whereis diff	finds where diff file is located
Echo $HOME	Path of home directory

pwd	Path of working directory
cd ~ or cd	Change to home directory
cd ..	Change to parent directory
cd -	Change to previous directory
tree	Bird's eye view of filesystem
ls	Lists all the contents present in the directory
ln	Creates hard and symbolic links
touch	Create a new file
Pushd dir	Pushes dir into a list
popd	pops the first directory in the list
dirs	Lists all the directories in the list
cat	List out all non long files
less	Uses scroll for listing files
Head, tail	Lists first and last 10 files respectively
mkdir ,rmdir	Creates and remove directories respectively
mv	Rename or move file to another location

- Multiple slashes are allowed in the path name but only one slash is considered
- Relative path name is path from the present directory used for less typing and doesn't start with '/' where as Absolute path name start with '/'.
- Pipes "|" are used for the complex results from shorter programs than one complex program to execute
- Grep is used as a program filter which lists the files that contains one or more specified strings
- Wildcards make it easy in searching file that the names were partially known
- Find when used with -exec command is able to run on all files it lists

Section 8 :

Linux documentation sources includes

Man Pages :Passing the topic name as an argument to the man command retrieves information about the topic stored in man page. Various options let the man command to print various results such as -f option prints all pages on the topic where as -k option prints all the pages that

discuss the specified topic.Man pages are specified into chapters and the user can select the specific chapter if he wants.

GNU info : it is a free form and contains linked subsections. Info <topic name> searches the topic in all the info files. The sections and subsections of a info topic is called node. We can move from one node to other using keystrokes

help command or --help option : A short description about a command can be obtained by using --help or -h option. help command performs the same function as that of --help option.

Other sources : it includes the Desktop help(GNOME help), online resources and package documentation

Section 9 :

Process : An instance for one or more tasks(threads).They can be of many types such as Interactive process, batch process, demons, threads, kernel threads

- Scheduler function of kernel shifts from one process to other providing a time slice for each process. Process undergoes various states such as running, waiting, sleep, zombie
- For a multiple thread process each thread has same PID but has unique TID
- For terminating a process with PID=pid we use kill command
    - Kill -SIGKILL pid or kill -9 pid
- The priority of a process can be set by specifying a Nice value such that the process with less nice value will be done in prior.
- The average of load given for a period of time is called as Load Average. This includes the process that are running, in run queue, uninterruptible sleepers. It can be viewed using w,time or uptime commands
- Ctrl + Z can be used for suspending and Ctrl + C is used for exiting the foreground processes
- Job -l command prints the pids of all the processes that are running in the background
- PS command provides information about the running processes. It can be used in either System V style or BCD style
- Ps command displays the processes in the form of a tree. Top command gives real time updates at every 2 seconds and exits when q.top is called. Processes are ordered by high CPU usage. Interactive keys can be used for monitoring and controlling processes
- at utility program allows us for scheduling a process on day based. Cron is a time based scheduling utility. Sleep suspends the processes by the specified period of time