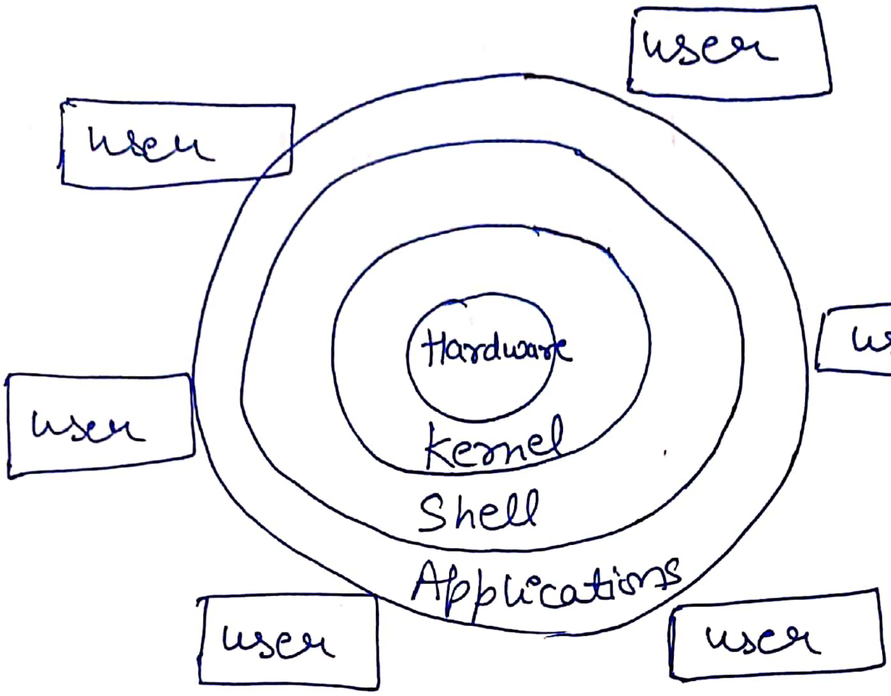
Linux Architecture



Hardware → Hardware consists of all physical devices attached to the system. For eg:- Hard disk drive, RAM, Motherboard, CPU etc.

Kernel → Kernel is the core component for any (Linux) operating System which directly interacts with the hardware

Shell → Shell is the interface which takes input from users and sends instructions to the Kernel. Shell also takes the output from kernel and send the result back to output shell. Examples of Shells are Bash Shell, Korn shell, Cshell etc.

Applications → These are the utlity programs that runs on shell. This can be any application like your web browser, mediaplayer, text editor etc.

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The Linux file System

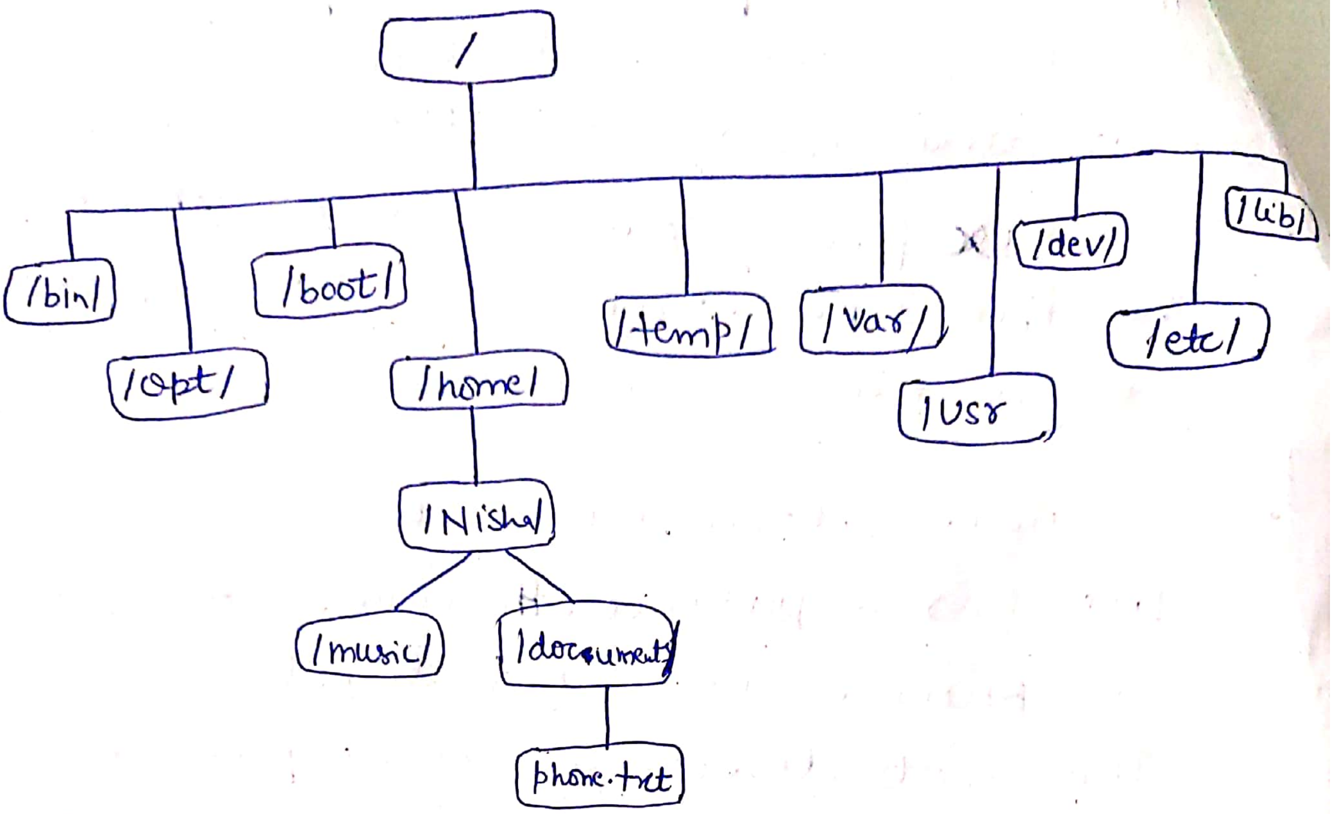
file System represents the organisation of files. File organisation is done to easily locate and access the files.

- The linux file System has a tree like Structure. The tree like Structure is also refered to as the Directory tree.

- In linux file System, each directory (or file) has a parent. However, the only exception is the root directory. The root directory has no parent, and is represented by a forward slash /.

- The root directory is the first or top most directory in the directory tree. The root directory contains files and Subdirectories, which contain more files and Subdirectories and so on.

→ File System Structure.



/ → is the root folder, all other folders come under root.

/bin → stands for binary. This directory contains executable programs and commands which can be used by all the users on the system. Delete this folder and your system is broken, because this contains the programs that are need to run Linux system.

/opt → opt stands for optional. This directory contains Software programs that are not stored by ~~the~~

ault on the system. For eg:- In ubuntu, google rome is not installed by default, and if we install it we will find it stored in /opt directory.

/boot → This folder contains configuration files and other necessary files that are needed by the boot loader.

/home → This folder contains the home folders of all the normal (non-root) users on the system. Think of its my documents in windows.

/temp → this folder contains temperary files that are erased upon reboot.

/var → var stands for variables. This directory contains variable data. Data that changes over time, this include user databases, log file etc.

/usr → This folder and its subfolder contains user installed programs and utilities and libraries.

/dev → this folder contains device files.

These files represent physical devices.

/etc → This folder contains all the configura files used by the system, we can also start and stop services (daemons) from here.

/lib → This folder contains software libraries.

→ <u>Valid Linux file Names</u>

(1.) Linux file names can be upto 256 characters long.

(2.) When naming files, both upper case and lowercase letters, numbers and certain special characters can be used.

(3.) Linux file names are case sensitive; Linux allows us to have Unique files named goodstuff, GOODSTUFF and goodStuff in the same directory.

(4.) Don't use asterisks, backslashes or question marks in Linux filenames, as these have special meaning to the shell.

(5.) Files starting with a dot are hidden files.

Referring a file in Linux

whenever a file / directory is referred, we use the Path name method.

A path name for every file or directory is the name Started with the root and then Sub directory names would be appended, each separated by / with the file name at the end. eg:- a file nisha.txt is present in the user directory will have a path name as - /usr/nisha.txt.

→ There are two types of path names

① **Absolute Path names** → begins with the root directory and follows the directory tree branch by branch until the path to the desired directory or file is completed.

eg:- /home/Nisha/documents/phone.txt

② **Relative Path names** → Starts from the current working directory.. There is a way of referring to current directory, refered by '.' and parent directory by '..' (moves one level up).

relative path name eg:- If our current working directory is Nisha, then we access the file phone.txt by the relative path-

./documents/phone.txt.

File Permissions

- Linux being multi-user system uses permissions and ownerships for security.
- There are three ~~owner~~ types of owner on a Linux System —: User, Group and other.
  - User ↓ person who creates file
  - Group ↓ multiple user
  - other ↓ rest
- Linux divides the file permissions into read, write and execute denoted by r, w and x respectively.
- All users in the group have the same file permissions

commands

1. The permissions on a file can be changed by 'chmod' command which is further divided into —:

- Absolute mode (Numeric)

  x = 1
  r = 4
  w = 2
  no permission = 0

  eg:- chmod 764 filename

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- Symbolic Mode — change permissions for a specific owner.

  + = Adds a permission to a file or directory.
  - = Removes the permission
  = = Sets the permission

eg:- Chmod o=rwx filename.

Chmod g+x filename

Chmod u-r filename

Chmod → • Stands for 'change node'.

- using this command, we can set permissions (read, write and execute) on a file /directo for the owner, group and Oth.