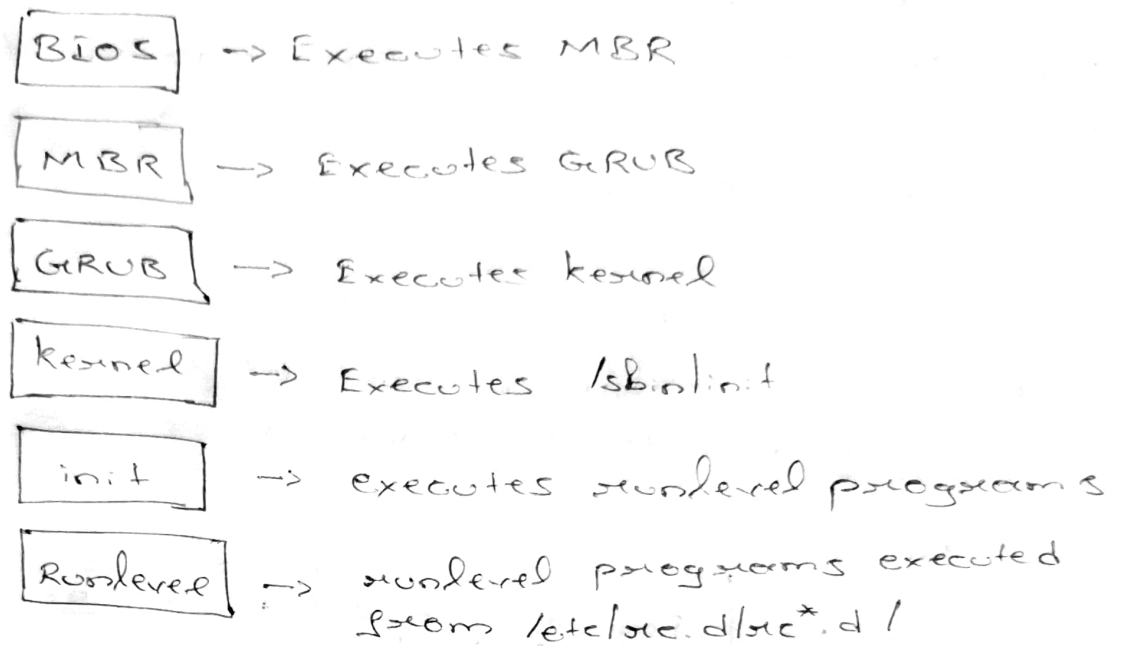


# Linux boot process or startup sequence.



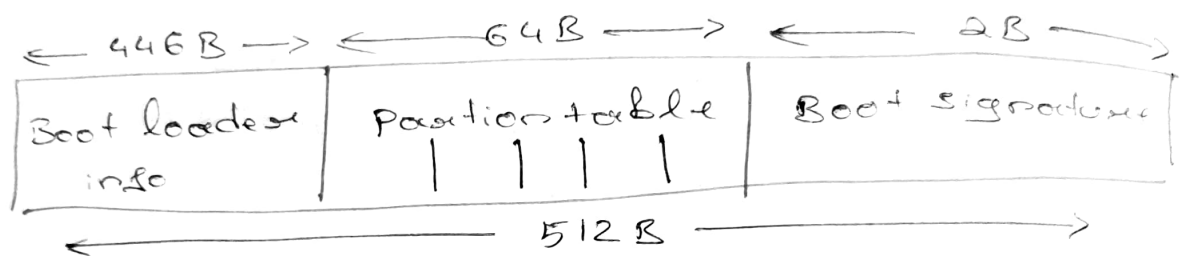
## BIOS (Basic Input/output System)

- \* performs some system integrity check.
- \* searches, loads & executes the boot loader program.
- \* It looks for boot loader in CD-drive, hard drive or any other storage.
- \* Once the boot loader program is detected & loaded into the memory BIOS gives control to it.
  - > A boot loader is a type of program that loads & starts the boot time tasks & process of an operating system.
  - > A boot loader is also known as a boot manager or boot strap loader.
- \* BIOS loads and executes MBR boot loader.

## ii. MBR (Master Boot Record)

- \* It is located in the 1st sector of the bootable disk.
- \* It can be found in /dev/hda or /dev/sda.
- \* MBR is less than 512 bytes in size having 3 components.

- primary boot loader info in 1st 446B
- partition table in next 64B
- MBR validation check in last 2B



- \* MBR contains information about GRUB or LILO
- \* Thus MBR executes the GRUB boot loader.

## iii. GRUB (Grand Unified Bootloader)

- \* If multiple operating system images are installed in a system, with the help of GRUB we can choose which one to be executed.
- \* GRUB displays a splash screen, waits for few seconds if we do not react then default kernel or OS will be loaded.
- \* It can be found in /boot/grub/grub.conf
- \* GRUB loads & executes kernel & initrd images.

## IV. Kernel

- \* It executes the `/bin/init` program
- \* `init` is the first program executed by kernel so the `init` process gets the process ID (pid) of 1.
- \* using `ps -ef | grep init` we can check pid.
- \* `initrd` stands for Initial RAM Disk.
- \* `initrd` is used by kernel as temporary root file system until kernel is booted & the real file system is mounted.
- \* It contains necessary drivers compiled ~~into~~ inside, which helps it to access hard drive partitions & other h/w.

## V. init

- \* Looks at the `/etc/inittab` file to decide the linux run level.
- \* Following are the available run levels.

0 - halt	4 - unused
1 - single user mode	5 - x11
2 - Multiuser, without NFS	6 - reboot
3 - Full multiuser mode	
- \* `init` defines the default init level from `/etc/inittab` & uses that to load all appropriate programs.

## vi. Runlevel programs

- \* Depending on the default init level setting the system will execute the programs.
- \* programs starts with s are used during startup. ~~s~~ s  $\rightarrow$  startup.
- \* programs starts with k are used during shutdown. k  $\rightarrow$  kill
- \* s & k will ~~end~~ end with sequence of ~~run~~ ~~with~~ which tells the system to start or kill the programs.