Linux and Data Structure

Booting process

1. BIOS (Basic input-output system)

- When computer is turned on, BIOS first Perform some system integrity check of HDD/SSD.

- Then the BIOS search, loads & execute the Boot loader program.

- Once the boot loader program is detected and loaded into the memory and Bios give the control to it

- In simple terms the Bios loads & execute the MBR Boot loader.

2. MBR (Master Boot loader)

- It contains information about GRUB
- MBR loads & execute the GRUB boot loader.

3. GRUB

- The GRUB display Splash Screen waits for few seconds if you dont enter anything it loads the default Kernel images as specified on the grub config file

- GRUB loads & execute Kernel & initrd images

Kernel

- Mounts the root file system as specified in the "root =" in grub.conf
- Kernel executes the /sbin/init program
- Initrd → Initial RAM disk
- initrd is the temporary root file system until kernel is booted & the real root file is mounted. It contain drivers, & helps in accessing the hard drive partitions etc.

5. init

looks at the /etc/inittab file to decide the Linux run level

- 0 - halt
- 1 - Single user mode
- 2 - Multiuser, without NFS
- 3 - Full multiuser.
- 4 - unused
- 5 - X11
- 6 - reboot

Init identifies the default initlevel - from /etc/inittab and uses that to load all appropriate program

6. Runlevel program

At this stage you will be able to see default services getting started

Depending on your default init level setting system will exec the programs from one of the following.

Run level 0 - /etc/rc.d/rc0.d/

Run level 1 - /etc/rc.d/rc1.d/

⋮

Run level 6 - /etc/rc.d/rc6.d.

Function of OS

- Security
  -> protects user's data
  -> It prevents unauthorized access to programs & user data

- Job accounting
  -> OS keeps track of time & resources used by various tasks

- Error detecting aids
  - Constantly monitor the system to detect errors and avoid malfunctioning of system

- Co-ordination b/w S/w & users
  OS - coordinates & assigns interpreters, compilers, assembler.

- Memory management
  - The OS manages the primary memory
  - It keeps track of memory, which bytes are used by which progs

- Processor Management
  - OS decides the order in which the process have access to the processor
  - Keeps track of the status of process

=> Commands on windows to check disk partition

->open power shell terminal

-> type diskpart

-> Diskpart > list disk

-> diskpart > list volumes

-> Diskpart > list partition

=> Commands to check Servers on windows

-> List all Servers

> sc queryextype = Service state = all

-> Search for specific Servics

> sc queryex type = Service state = all | find /i "

Service name" : my service

=> Steps to start & stop Server in windows

Stop Servics

->open Start

-> search Servics

-> Click on the Servics you want to stop

-> Click Stop to stop button

-> Apply

Stop Services

-> Open Start
-> Search Services
-> Click on the service you want to stop
-> Click Stop
-> Click apply.

Monolithic & Microlithic Kernel

Microkernel

-> User Servers & Kernel are kept in seperate address space

-> OS is complex to design

-> Microkernel is small in size

-> Easier to add new functionality

-> Execution speed is low

-> Failure of one component does not effect the working of Microkernel

Monolithic Kernel

-> Both user Servers & Kernel Servers are kept in same address space

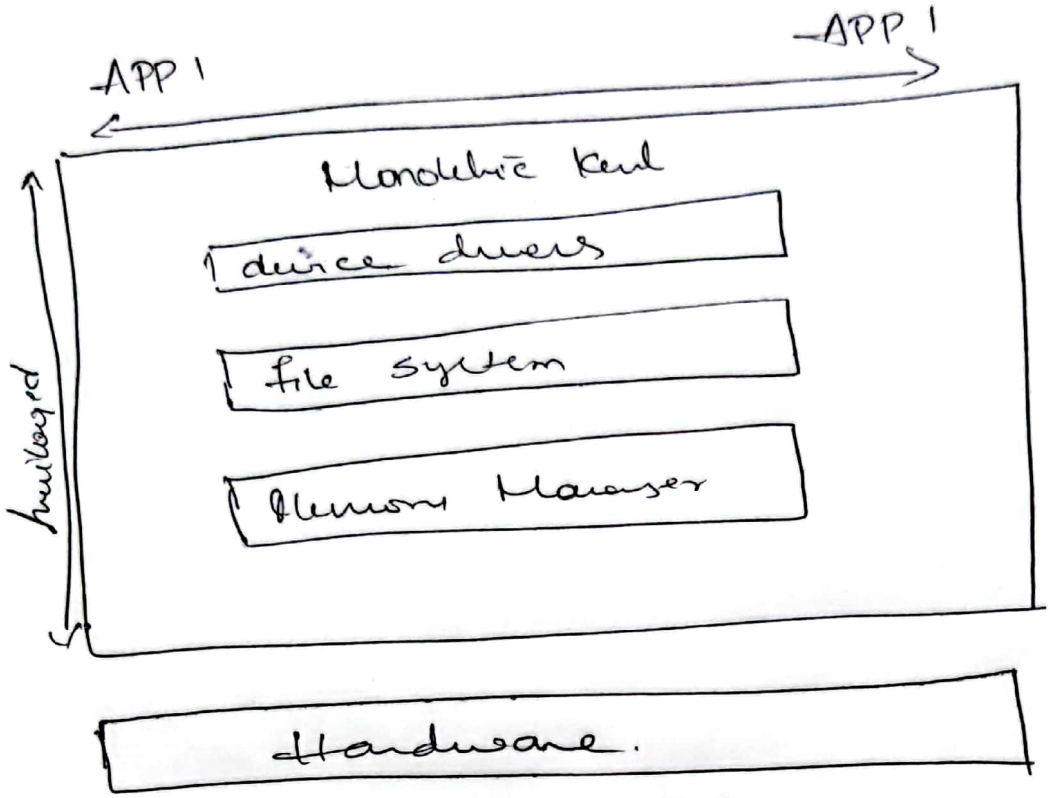
-> OS is easy to design & implement

-> Monolithic kernel are larger in size

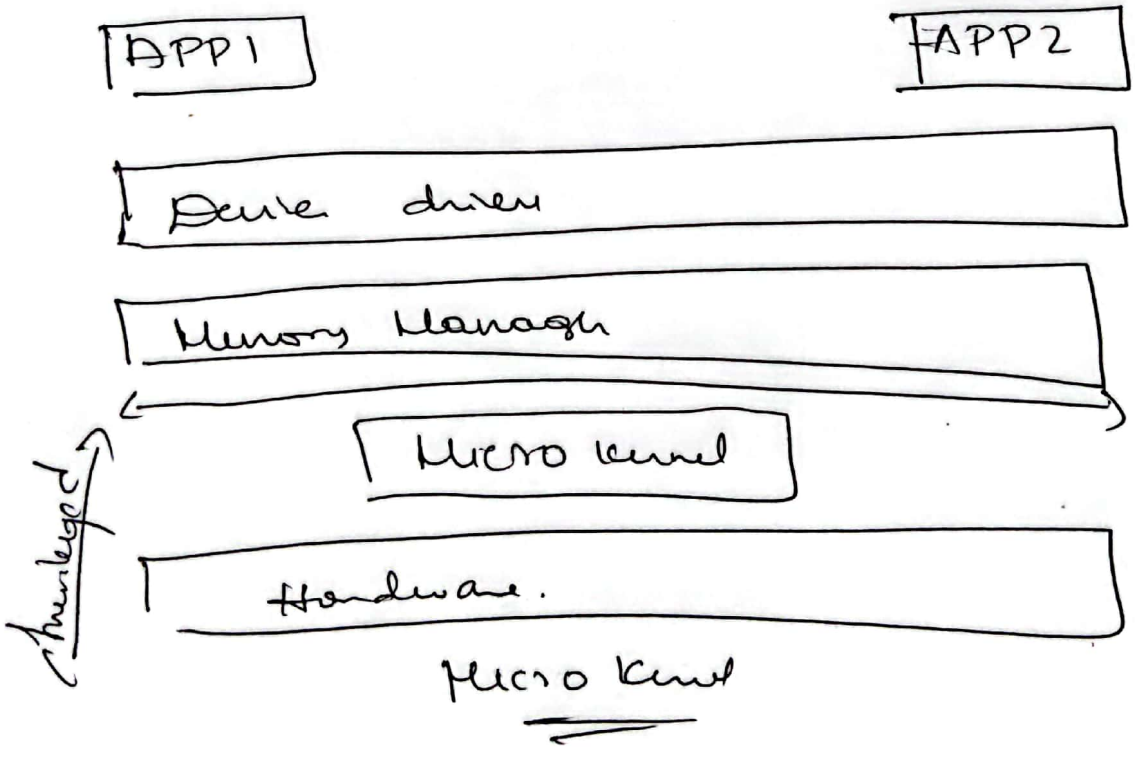
-> Difficult to add new functionalities

-> Execution Speed is high

-> Failure of one component leads to failure of entire system.



Monolithic Kernel



Micro Kernel