

→ Networking in Linux  
→ Directory Structure  
→ CRONTAB

## Assignment .

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### 1. Booting Process - 6 stages .

Power up / Reset

System Startup

Stage 1 boot loader

Stage 2 boot loader  
kernel

Initialization of user space

Operation

BIOS / Boot monitor

Master Boot Record

GRUB, LILO, UEFI

OS

#### 1. BIOS: (Basic Input / Output System)

- \* Performs some system integrity checks
- \* Searches for loads & executes boot loader program
- \* It looks for boot loader in floppy, cd-rom or hard drive

\* BIOS loads & executes MBR boot loader

#### 2. MBR

- \* Master Boot Record loads & executes GRUB boot loader

- \* It located in 1st sector of bootable disk
- \* MBR is less than 512 bytes, is fixed and has 3 comp.
  1. Primary Boot Loader info in 1st 446 bytes
  2. Partition table info in next 64 bytes
  3. mbr validation checks in last 12 bytes.

### 3. GRUB Grand Unified Bootloader

- \* Displays a splash screen, waits for few seconds, if we don't enter anything it loads the default kernel image as specified in the grub configuration file.

### 4. Kernel

- \* Maintains root file system as specified in the `root = "` in `grub.config`.
- \* Kernel executes its `/sbin/init` program
- \* `initrd` stands for initial RAM disk.
- \* Since `initrd` has the process id (PID) of 1. Do a `ps -ef | grep init` to check the pid.

### 5. Init

- \* Looks at `/etc/inittab` file to decide the Linux run level.

Following are the available run levels.

0 - halt

1 - Single user mode.

2 - Multiuser, without NFS

3 - Full Multiuser mode with network

4 and Unspecified or of the reboot prompt

5 and XII have no idle wait time

6 is Reboot is about restarting the system

\* It identifies the default instance from /etc/inittab and uses that to load all appropriate programs.

## 6. Run-level Programs:

\* When Linux system is booting up, "Starting sendmail ok" Those are runlevel programs, executed from run-level directory as defined by your run level.

\* Programs start with s → startup and X → shutdown.

\* Under /etc/rc.d/rcx.d/ directories, programs start with s and k.

## 2. Functions of OS.

### → Security

\* The OS uses password protection to protect user data & similar other techniques.

\* It prevents unauthorized access to programs & user data.

### → Control over System performance.

\* Monitors the system health to help improve performance.

/etc/inittab, /etc/rc.d/rcx.d/direct,

## Job accounting:

OS keeps track of time and resources used by various tasks & users. This performance can be used to track resource usage for a particular user or group of users.

## Error Detecting aids:

The OS constantly monitors the system to detect errors & avoid the malfunctioning of computer system.

## Coordination between other SW and HW.

OS also coordinates and arranges interpreters, compilers, assemblers and other software to the various uses of the computer system.

## Memory Management:

\* The OS manages the Primary Memory or main memory. Main memory is made up of a large array of bytes or words where each byte or word is assigned a certain address.

\* Keeps track of primary memory which bytes of memory are used by which user program.

## Process Management

OS uses process scheduling which involves dividing the order in which processes have access to the processor & its duration.

## Device management

OS manages device communication via their respective drivers.

- \* keeps track of connected devices.

- \* Designates a prog responsible for every device known as I/O controller.

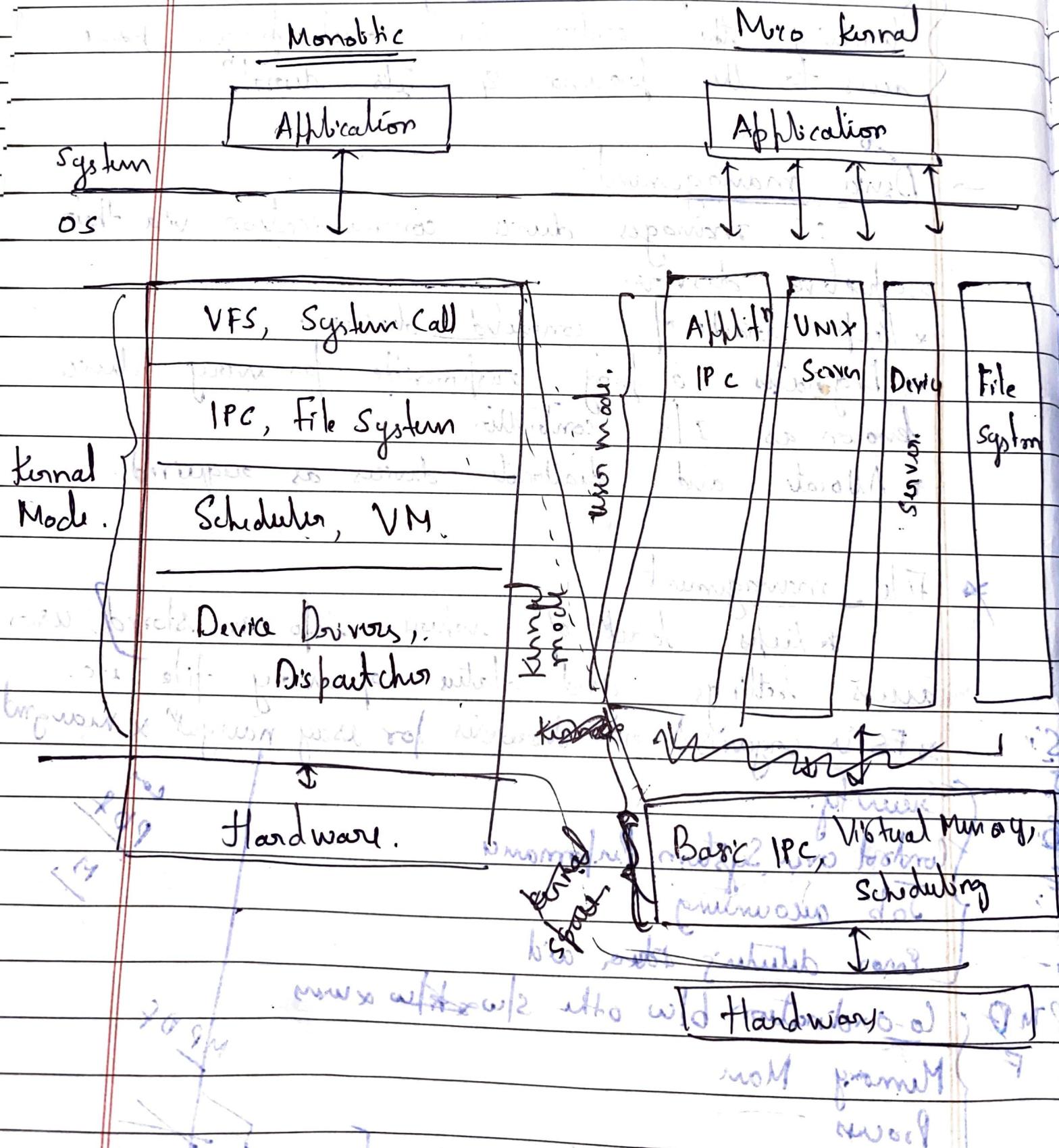
- \* Allocates and deallocates devices as required.

## File management

- \* keeps track of where info is stored user access settings and status of every file etc.

- \* FS is organised into directories for easy navig & managm

3. With neat diagram explain difference b/w Monolithic and Micro kernel.



\* In monolithic kernel, both user services & kernel services are kept in the same address space.

\* Kernel is larger than microkernel.

\* Fast execution.

\* The monolithic kernel is hard to extend.

\* If system service crashes the whole system crashes.

\* To build a monolithic kernel less code is required.

Ex: Linux

\* User service & kernel services are kept in separate address space.

\* Microkernel are smaller in size.

\* Slow execution.

\* Easily extendible.

\* If service crashes it does not effect on working of microkernel.

\* More code is required.

Ex: QNX, Mac OS X.

## Q) Difference b/w UEFI boot & Legacy.

### UEFI boot.

- \* UEFI provides better user interface
- \* provides faster boot time
- \* Security additional is more efficient

↳ More user friendly

↳ Provides user friendly

· GUI & recognizes

large storage devices

as opposed to legacy boot

↳ User friendly

### Legacy Boot

- \* Is traditional and very basic

↳ Similar compared to UEFI

↳ slower compared to UEFI

↳ less user friendly.

↳ It stores a list of installed storage devices that are bootable according to a configurable order of priority.

## 3) Discuss on OS , Linux, Windows & Mac OS.

### Linux

- \* open source
- \* Stores data in the form of tree.
- \* Does not have a specific registry of its own
- \* Provides terminal
- \* Easy to switch interface.

Windows

- \* Closed source
- \* Uses directory structure
- \* Registry is a master database which stores all the settings
- \* Terminal is command prompt.
- \* Not interchangeable interfaces till windows 8

MAC OS

- \* Closed source
- \* Uses the file structure commonly known as mac os X
- \* Stores all "application" settings in a series of plist files
- \* Provides control as terminal
- \* has a facility to bridge virtual no interface

Q] Commands on Windows os to check disk partition

→ Step 1: Open command prompt

Step 2: Use diskpart command.

Active: Mark the selected partition as Active

Add: Add a mirror to a simple volume.

Break: Break a mirror set.

clean: clean clear information off the disk.

compact: Attempt to reduce physical size of disk file.

Delete: Delete an object.

Exit: Exit from diskpart

List: Display list of objects.

Select: Shift the focus on object.

Import: Import disk group

Q) List the commands to check services in Windows.

→ Open Command prompt

↳ type `services.msc`

↳ Press enter.

Q) List the steps to check disk partition in Windows.

→ 1. Open file explorer

2. Right click on 'The PC'

3. Choose 'Manage' from pop up menu.

4. Navigate to Storage → Disk Management in navigation panel.

Q9. List the steps to start or stop services in windows.

→ Step 1: Press Windows key + R to open the run windows.

Step 2: Type in services.msc in the open box.

Step 3: Services dialog box will open.

Step 4: Select the service to start/stop.

Step 5: Choose the relevant option to open.

services.msc

- Go to windows services tabbed section. Click on services button at left.

Windows services window - list of services

- scroll to find task scheduler in list.

task scheduler back

# find: Search for files in a directory hierarchy  
find -H : List of all the files.

# cut: removes section from each line of file.  
-b bytes. cut -b 1,2,3 ll.txt  
-d delimiter. cut -d " " ll.txt

# grep: to search for patterns in each file.  
grep Add ll.txt

# sed: stream editor for filtering and transforming text

\$ sed 's/unix/linux/g' filename  
outflow with this.  
this

# sort: Writes sorted concatenation of all files to standard output.  
Sort filename.

Sort -n filename "Sorts in numerical order"

Sort -f filename

# head: outputs the first part of files.

head filename.txt

# tail: output the last part of files.

tail file.txt

tail -n 2 file.txt

# fdisk: manipulates disk partition table.

\$ sudo fdisk -l

# journalctl: used to query the contents of the system as written by systemd-journal service.

\$ journalctl

# crontab

# crontab: is program used to install, uninstall or list the tables used to drive the cron daemon in Unix cron.

# dmesg: print or control the kernel ring buffer.

Also called "driver msg".

dmesg | less

dmesg | grep "text to search."