1. Booting Process

Stages involved in booting are as shown

Power-up / Reset

| | |
|---|---|
| System start-up | BIOS / Boot monitor |
| Stage 1 bootloader | Master boot Record (MBR) |
| Stage 2 bootloader | GRUB, LILO, UEFI, etc |
| kernel | OS { Linux, windows } |
| init | user space |

Operation

BIOS → Basic input/output system

It is stored in flash memory on the motherboard. It is the first code executed by processor. BIOS must determine which devices are candidate for boot.

when the boot device is found, the first stage boot loader, is loaded into RAM and executed. MBR is less than 512 bytes in length and its job is to (load (boot 2 loader). Stage 2 bootloader

The 512 bytes of MBR are used as follows

446 bytes of boot loader
64 bytes for partiting table
2 bytes for magic number

In this case of 4 partition on the disk can be used with the 64 byte memory.

The magic number allocation must contain the hex value AA55 which officially classifies this as a valid MBR. An invalid magic number indicates a corrupt or missing MBR.

Once the second stage bootloader is in RAM and executing, Linux (os) and an optional RAM disk (temporary) or root file system) are loaded into memory.

When the images are loaded, Stage-2 bootloader passes control to the kernal image and kernal is decompressed and initialized.

Stage 2 bootloader at this stage checks the system hardware enumerates the attached hardware devices, mounts the root device and loads the necessary kernal modules.

Once the above steps are completed first user space program (init) starts and high level system initialization is performed.

2. Functions of operating system (OS)

a. Security
b. Control over system performance
c. Job accounting
d. Error detecting aids
e. Coordinating between other software and users
f. memory management
g. process management
h. device management
i. file management.

1) Security :→ Prevents access to programs and users data without authentic

2) Control over system performance :→
Monitors all covered system health to improve proformance. Records response time between service request and system response having complete view of system health to provide important information to troubleshooting problems.

3) Job accounting :→ keeps track of time and resources used by various tasks and user that can be used to track resource usage of users (s).

4) error detecting aids :→ constantly monitors the system to detect errors and avoid malfunction.

5) Coordination between other software and users
OS also coordinates and assign interpreter compilers, assemblers and other software to the various users of the computer.

6) Memory management :→
OS manages the primary memory or the main memory (RAM) by keeping track of primary memory of which memory addresses are used and which are not ? and in multiprogramming it controls the order of processor access to memory and duration of the same.

7) Process management :
OS manages device communication via their respective drivers
- keeps track of connected devices
- Designates a program responsible for every device known as i/o controller.

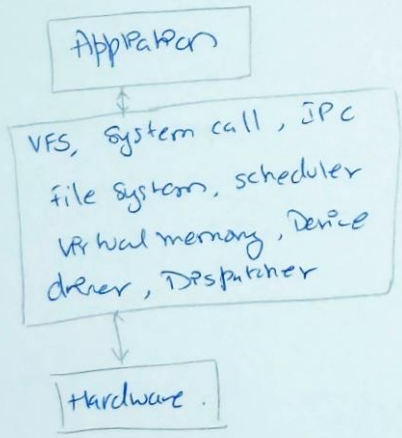
Decides which processor gets to a certain device and how long.
Allows and deallocates devices as required.

8) File Management :→

Keeps track of where information is stored user access settings and status of every file etc.

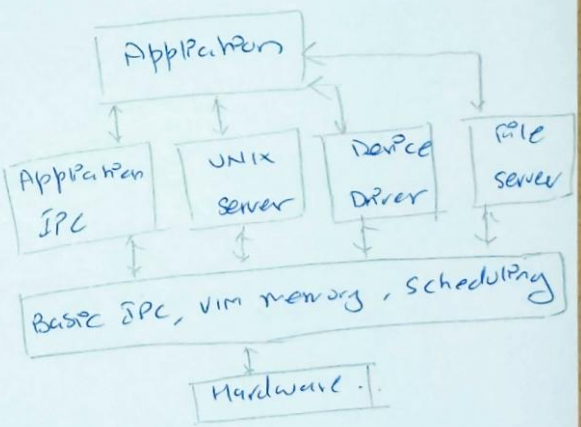
3. with a neat diagram explain the difference between monolithic vs micro kernal.

Monolithic kernal




- Provides mechanism such as low-level address space management, thread management and inter process communication to implement an OS.
- Kernal contains the OS services
- Fast
- Bigger in size

Micro kernal




- Entire operating system works in the kernal space
- OS service and kernal area seperated.
- slow
- smaller in size.

| | |
|---|---|
| • Failure in one component affects the full system | • Failure in one component won't affect the entire system. |
| • Difficult to add new functionality | • Easier to add new functionality. |

4. Difference between UEFI and Legacy boot.

| LEGACY BOOT | UEFI |
|---|---|
| 1) leagecy boot is the boot process used by BIOS firmware | 1) UEFI stands for Unified Extensible firmware interface. |
| 2) It stores a list of installed storage devices that are bootable according to a configurable order of priority | 2) It provides a user friendly graphical user - interface and recognises larger storage devices. |
| 3) Security and efficiency is lower compared to UEFI | 3) Has additional security features and is more efficient. |
| 4) less user friendly | 4) more user friendly. |
| 5) uses the GTP partitioning scheme | 5) uses the MBR partition |
| 6) uses BIOS firmware for boot process | 6) uses UEFI firmware for boot process. |

5. Discuss on the OS Linux, windows and Mac OS.

| | | |
|---|---|---|
| 1) open source | 1) closed source | 1) closed source |
| 2) Stores data in the form of data. There is a single file tree and all the devices are mounted on this tree | 2) uses directory structure to store different kinds of files of the user. It has logical drives and cabinet drawers | 2) uses the file structure commonly known as mac OS X |
| 3) Does not have a specific registry of its own. | 3) Registry is a master database which stores all the settings | 3) Stores all application settings in a series of plist files. |
| 4) Provides terminal | 4) Terminal is command Prompt. | 4) Provides console as terminal. |
| 5) Easy to switch interfaces | 5) Not interchangable interface like windows & | 5) Has a facility to bridge virtual N/w interfaces. |

6. Commands on windows os to check disk partition.

Step 1 :→ open command promkt

Step 2 :→ use 'diskpart' command

Diffent operations can be performed like add, create, clean etc.

7. List the commands to check services in windows

One can services from CMD by the command services.msc or

→ task manager → services → Open services.

8. List the steps to check disk partition in windows.

1) Open file explorer
2) Right click "This PC"
3) Choose 'manage' from the pop-menu.
4) Navigate to storage → Disk management in navigation panel.

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

Step 1 :→ Press "win + R" to open run window

Step 2 :→ type services.msc in the window press enter.

Step 3 :→ Service box will pop-up

Step 4 :→ selet the series to start / stop

Step 5 :→ Choose the relevant option to operate.