Operating System Overview

Q.1 Define OS and explain different objective and functions of OS.

⇒ • Definition

⇒ An operating system acts as interface between the user and hardware of the computer and also controls the application program.
It is also called as resource manager.

• Objectives :

i) Convenience - Computer system can be conveniently used due to OS.
ii) Efficiency - Computer system comprises many resources. All these resources are utilized by user's application in efficient manner due to OS.
iii) Ability to Solve - The design of OS permits the efficient development, testing.
It is also supports for flexibility by allowing for addition of new system functions without interfering with service.

• Functions :

i) Memory Management
⇒ The OS manages the allocation and deallocation of memory to various processes, ensuring that each process gets the required amount of memory.
It performs tasks like paging,

virtual memory management.

ii) Process Management

⇒ The OS allocates the processor time to various processes, managing their execution. It also handles process scheduling, deadlock prevention, avoidance.

iii) Device Management

⇒ The OS manages the I/O devices attached to the computer, providing an interface between the devices and the application software. It handles tasks like device allocation, interrupt handling.

iv) File Management

⇒ The OS manages files and directory including their creation, deletion and modification.

v) Security

⇒ The OS provides various security features to protect the system and its resources from unauthorized access and malicious software.

vi) User Interface

⇒ The OS provides GUI, command-line interface to interact with computer system.

Q.2 Differentiate between monolithic and microkernel.

⇒

Monolithic Kernel	Micro Kernel
1) If a virtually entire operating system code is executed in kernel, then it is a monolithi program that runs in a single addressed space.	1) In microkernel, set of modules managing the hardware is kept which can uniformly well be executed in user mode.
2) There is a same address space for kernel as well as user mode.	2) There is a different address space for user as well as kernel mode.
3) It has a large space compared to microkernel.	3) It has a smaller space compared to monolithic kernel.
4) Execution speed is faster as compared to micro kernel.	4) Execution speed is slower as compared to monolithic kernel.
5) If one service crashes whole OS fails.	5) If one service crashes whole OS do not fails, it does not affect working of other part of micro kernel.
6) Kernel calls the function directly. for communication.	6) Communication is done through message passing.
7) It is hard to extend.	7) It is easily extendible.

8) To write monolithic kernel less code is required.	8) To write microkernel more code is required.
9) E.g., Linux, BSDs, etc.	9) E.g., QNX, L4LINUX, etc.

Q.3 Describe microkernel with diagram

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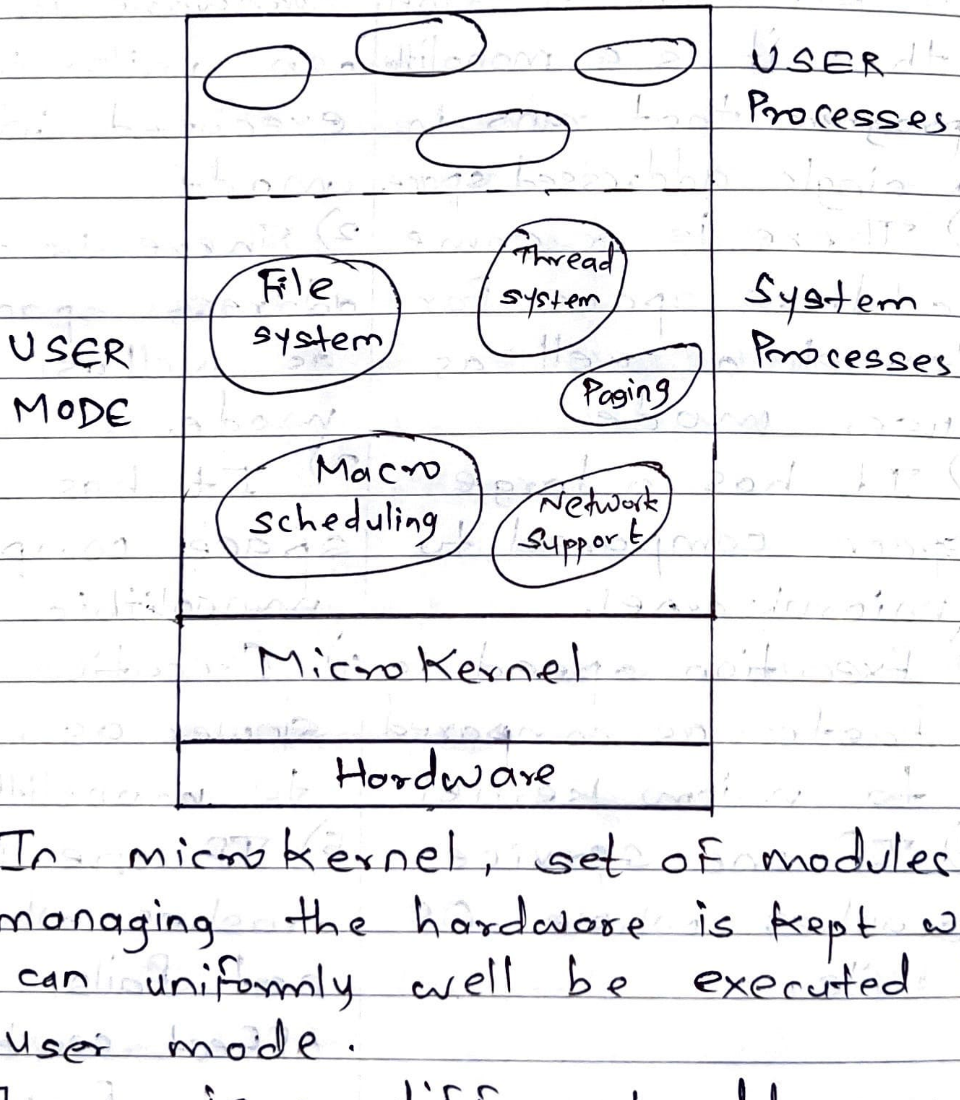

i) In microkernel, set of modules for managing the hardware is kept which can uniformly well be executed in user mode.

ii) There is a different address space for kernel mode as well as user mode.

iii) It has smaller space as compared to monolithic.

iv) Execution speed is slower than monolithic.

v) If one service crashes , OS does not ~~era~~ fails , it does not affect working of other part micro kernel.

vi) Communication is done through message passing.

vii) To write microkernel more code is required.

viii) It is easily extendible.

ix) It is more flexible.

For e.g., QNX, Symbian, L4LINUX, etc.

Q.4 Explain Shell. Explain use of chomd command in Linux

⇒ • Shell

⇒ Shell is a system in which we can orun our commands, programs and shell scripts. There are different flavours ore shells as there are different flavour's of OS. Each flavour of shell has its own set of recognizable commands & Functions.

• CHOMOD Command

⇒ chomod changes the permission of each given file according to the given mode, where mode describes the permission to modify. Mode can be specified with octal number or with letters.

- In Linux who can do what to a file, or directony is controlled through set of permissions. There are three sets of permission. One for the owner of file, another for member of file's group and a final set for everyone else.

- Classes of users are used to distinguish to whom permissions giving. If no classes are specified 'all' is implied.
- The classes are represented by one or more of following letters

⇒

1) u (user)
⇒ Owner of file

2) g (group)
⇒ File group member

3) o (others)
⇒ Not owner and not a group member of file system.

4) a (All)
⇒ All the three of above commands.

Q.5 What are system calls ? Explain any five calls in detail.

⇒ i) The interface between OS and user programs is defined by set of systen calls that OS offers.

ii) System call is the calls of OS to perform some task on the behalf of the user's program.

iii) Therefore, System calls makes up the interface between processes and the OS.

iv) The system calls are function used in Kernel itself.

v) Due to system calls, the code is executed in the kernel so that there must be a mechanism to change the process mode from user mode to kernel mode.

- System calls categorized in five groups.-

1) Process Control

⇒ End, abort, load, execute, create process, get process attributes, set process attributes, wait for time, wait event, allocate and free memory.

2) File manipulation

⇒ create file, delete file, open, close, read, write, reposition, get file attributes, set file attributes.

3) Device manipulation

⇒ request device, release device, read, write reposition, get device attributes, set device attributes, logically attach or detach devices.

4) Information maintences

⇒ get time or date, set time or date, get system data, set system data, get process, file or device attributes.

5) Communications

⇒ create, delete communication connections, send, receive message, transfer status information, attach or detach remote devices.