

Operating system

MODULE-1: Introduction to Operating Systems

1. Introduction: Definition, evolution, types of operating systems (batch, interactive, real-time, distributed, embedded).
2. Operating System Services: Process management, memory management, file management, device management, networking, security.
3. System Calls: Introduction, types of system calls, API (Application Programming Interface).
4. System Structures: Layered architecture, monolithic vs. microkernel architecture.

MODULE-2: Process Management

1. Process Concept: Process definition, process states, process control block (PCB).
2. Process Scheduling: Primitive vs. non-primitive scheduling, scheduling algorithms (FCFS, SJF, Priority, Round Robin).
3. Inter-process Communication (IPC): Shared memory, message passing, semaphores, mutexes.
4. Process Synchronization: Critical section problem, semaphores, mutexes, monitors.

MODULE-3: Memory Management

1. Memory Management Techniques: Contiguous allocation, paging, segmentation.
2. Virtual Memory: Address space and memory space, demand paging, page replacement algorithms (FIFO, LRU, Optimal).
3. Thrashing: Causes, detection, and prevention.
4. Memory Protection: Memory segmentation and paging for protection, memory access control.

MODULE-4: File System Management

1. File System Concept: File organization, directory structure, access control mechanisms.
2. File System Implementation: Indexed allocation, linked allocation, 1-nodes.
3. File System Operations: Creating, deleting, opening, closing, reading, writing, seeking.
4. Disk Scheduling: FCFS, SCAN, C-SCAN scheduling algorithms.

MODULE-5: Security and Operating System Examples

1. Operating System Security: Threats and vulnerabilities, user authentication, access control, encryption, firewalls.

2. Case Studies: Introduction to popular operating systems like Windows, Linux, and their key features