

Department : CSE-DS

Year & Semester : III year V sem

Sub Code & Sub Name :23CSE242, Operating Systems

Unit-I

S.No	Part-A Questions
1.	What is an Operating System?
2.	What is the difference between multitasking and multiprogramming?
3.	Name any two types of computing environments.
4.	Give two examples of open-source operating systems.
5.	What is the purpose of an operating system service?
6.	Differentiate between CLI and GUI.
7.	What is a system call?
8.	List any two categories of system calls.
9.	Mention two examples of system programs.
10.	State one advantage and one disadvantage of using a microkernel structure.
11.	What is the main role of the bootstrap program in system booting?
12.	What is meant by operating system debugging?
13.	State two user goals in OS design.
14.	Define dual-mode operation in an operating system.
15.	Define "Kernel" in the context of an Operating System.

S.No	Part-B Questions
1.	Explain the functions of an Operating System.
2.	Describe the operations of an Operating System.
3.	Discuss the different types of computing environments in Operating Systems.
4.	What are Free and Open-Source Operating Systems? Discuss their advantages.
5.	Explain the Different Types of System Calls in Detail.
6.	Discuss the Different Operating System Structures.
7.	Describe the Process of Building and Booting an Operating System.
8.	Explain the Design and Implementation of an Operating System.
9.	Explain the functions of an Operating System.
10.	Describe the operations of an Operating System.
11.	Illustrate the differences between user interfaces (CLI, GUI, and touch interface) with examples.
12.	Compare traditional computing environments with cloud and mobile computing environments.
13.	Compare different operating system structures: layered, microkernel, and modular.
14.	Evaluate the advantages and disadvantages of microkernel and hybrid operating system structures.

15.	Discuss the goals and issues in operating system design and implementation.
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Unit-II

S.No	Part-A Questions
1.	Define a process in an operating system.
2.	Differentiate between process and thread.
3.	What is a process control block (PCB)?
4.	State two types of process scheduling.
5.	What is inter-process communication (IPC)?
6.	Define context switching.
7.	Name two operations that can be performed on processes.
8.	What is the difference between blocking and non-blocking communication?
9.	Mention any two multithreading models.
10.	State one advantage of using threads over processes.
11.	What is a race condition?
12.	Define semaphore.
13.	Mention one difference between mutex and semaphore.
14.	What is the readers-writers problem in IPC?
15.	Write one use of barriers in process synchronization.

S.No	Part-B Questions
1.	Explain the Concept of Process Scheduling with Different Types of Scheduling Algorithms.
2.	Describe the Operations on Processes in Detail.
3.	Explain Inter-Process Communication (IPC) Mechanisms.
4.	Explain different multithreading models used in operating systems.
5.	Discuss various thread libraries available and their key differences.
6.	Explain thread synchronization mechanisms and their importance in multithreading.
7.	Discuss the impact of multithreading on program performance, including both benefits and challenges.
8.	Explain the Scheduling Criteria for CPU Scheduling.
9.	Discuss Different CPU Scheduling Algorithms.
10.	Explain the concept of Multiple Processor Scheduling.
11.	Explain Peterson's Solution for two processes.
12.	Describe the use of Mutex Locks in Synchronization.
13.	Explain Semaphores and their types.
14.	What are the classic synchronization problems and their solutions?
15.	Discuss Monitors and their usage in synchronization.

Unit-III

S.No	Part-A Questions
1.	Define memory management in operating systems.
2.	What is swapping?
3.	Differentiate between logical address and physical address.
4.	What is internal fragmentation?
5.	Name two contiguous memory allocation techniques.
6.	Define paging.
7.	What is segmentation in memory management?
8.	State one advantage of paging over contiguous allocation.
9.	What is virtual memory?
10.	Define demand paging.
11.	What is copy-on-write?
12.	Mention any two-page replacement algorithms.
13.	What is thrashing?
14.	State one difference between memory-mapped files and conventional file access.
15.	What is kernel memory allocation?

S.No	Part-B Questions
1.	Explain contiguous memory allocation and its types. Discuss its advantages and disadvantages.
2.	Explain paging in memory management. Describe the structure of a page table.
3.	Explain the concept of swapping in operating systems. What are its advantages and disadvantages.
4.	Explain demand paging with the help of an example.
5.	Explain the role of memory management in an operating system.
6.	Explain page replacement algorithms and discuss some common algorithms used.
7.	Compare paging and segmentation. Explain with diagrams
8.	Explain the allocation of frames in a virtual memory system.
9.	What is copy-on-write? Describe its benefits with an example.
10.	Compare different page replacement algorithms: FIFO, Optimal, and LRU.
11.	Explain frame allocation strategies in detail with examples.
12.	What is thrashing? Explain causes, detection, and prevention methods.
13.	Write short notes on memory-mapped files and their advantages.
14.	Explain kernel memory allocation techniques with examples.
15.	With an example, explain how virtual memory helps in running large programs.

Unit-IV

S.No	Part-A Questions
1.	What is a resource in the context of operating systems?
2.	List the four necessary conditions for a deadlock.
3.	What is the Ostrich algorithm in deadlock handling?
4.	Define deadlock detection.
5.	What is the difference between deadlock prevention and deadlock avoidance?
6.	Define a file.
7.	What is the purpose of a directory in a file system?
8.	State one method of file allocation in file system implementation.
9.	What is file system optimization?
10.	Define disk scheduling.
11.	What does RAID stand for?
12.	Mention two levels of RAID.
13.	What is stable storage?
14.	Define disk fragmentation.
15.	State one difference between primary and secondary storage.

S.No	Part-B Questions
1.	Explain in detail about Deadlock Characterization
2.	Explain in detail about Methods for Handling Deadlocks
3.	Explain in detail about Deadlock Prevention and Deadlock Avoidance
4.	Explain in detail about Deadlock Detection
5.	Give detail notes Recovery from Deadlock
6.	Explain the structure and components of a File System.
7.	Discuss the various File Access Methods in detail.
8.	What are the different Directory Structures used in file systems? Explain their advantages and disadvantages.
9.	Describe the methods of File Allocation with their pros and cons.
10.	Discuss the concept of File System Mounting, Partitions, and Mounting.
11.	What are the major responsibilities of file system management and optimization?
12.	Describe the different Disk Scheduling Algorithms used for HDDs.
13.	What is RAID? Explain RAID levels 0, 1, and 5 in detail.
14.	Write short notes on stable storage implementation.
15.	Compare various disk scheduling algorithms and evaluate their performance with examples.

Unit-V

S.No	Part-A Questions
1.	What are the main goals of protection in operating systems?
2.	Define the domain of protection.
3.	What is an access matrix?
4.	Differentiate between access control and access rights.
5.	What is meant by revocation of access rights?
6.	Define system security.
7.	Mention two examples of program threats.
8.	What is a Trojan horse?
9.	State one example each of system threat and network threat.
10.	What is cryptography in the context of system security?
11.	Mention two common methods of user authentication.
12.	What is a firewall?
13.	Define computer security classification.
14.	State one difference between Linux and Windows operating systems.
15.	Mention one security feature provided in Microsoft Windows.

S.No	Part-B Questions
1.	Explain the goals of protection in an operating system with examples.
2.	Describe the principles of protection and explain the concept of the domain of protection.
3.	What is an access matrix? Explain its implementation and use in system protection.
4.	Discuss access control mechanisms. How are they different from access rights?
5.	Explain revocation of access rights and different methods of revocation.
6.	Discuss various types of program threats (Trojan horse, trapdoor, logic bomb, etc.) with examples.
7.	Explain system threats such as worms, viruses, and denial-of-service (DoS) attacks.
8.	What are network threats? Explain sniffing, spoofing, and man-in-the-middle attacks.
9.	Explain the role of cryptography in ensuring system security.
10.	Discuss different methods of user authentication (passwords, biometrics, multi-factor authentication).
11.	Explain how security defences can be implemented in modern operating systems.
12.	What is a firewall? Discuss different types of firewalls and their role in system and network protection.
13.	Explain the computer security classification models
14.	Write a short case study on Linux security features (user accounts, file permissions, etc.).
15.	Write a short case study on Microsoft Windows security features.