NARAYANA ENGINEERING COLLEGE::NELLORE

AUTONOMOUS

BRANCH: CSE **YEAR: II** **SEMESTER: II**

ACADEMIC YEAR: 2024-25

COURSE TITLE: OPERATING SYSTEMS

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IMPORTANT QUESTIONS FOR MID

S.No	Question	CO	BL	Marks
	MODULE-I			
1	What is an operating system, and what is its primary purpose?	1	2	10
2	List and briefly describe functions of an operating system.	1	2	10
3	What are the main operations of an operating system?	1	2	10
4	What are computing environments. Explain in detail?	1	2	10
5	Explain operating system services?	1	2	10
6	Explain different types of system calls?	1	2	10
7	What factors should be considered when designing an operating system?	1	1	10
8	What is the process of building and booting an operating system?	1	2	10
9	Explain operating system debugging?	1	2	10
10	Explain free and open-source operating systems?	1	2	10
	2 MARKS QUESTIONS			
1	Define an operating system?	1	2	2
2	List two primary functions of an operating system?	1	2	2
3	What are the two main types of operating system operations?	1	2	2
4	Give examples of two computing environments where operating systems are used?	1	2	2
5	Name any two services provided by an operating system?	1	2	2
6	What is the purpose of system calls in an operating system?	1	2	2
7	Differentiate between user interface and system interface?	1	2	2
8	What is the role of system programs in an operating system?	1	2	2
9	Define operating system structure?	1	2	2
10	What is the purpose of booting an operating system?	1	2	2

<table>
<tr><th colspan="5">MODULE-II</th></tr>
<tr><td>1</td><td>Explain with a neat diagram various process states and the importance of Process Control Block?</td><td>2</td><td>3</td><td>10</td></tr>
<tr><td>2</td><td>Explain with a neat diagram the concept of scheduling queues?</td><td>2</td><td>2</td><td>10</td></tr>
<tr><td>3</td><td>What is inter-process communication (IPC), and how does it function in an operating system?</td><td>2</td><td>3</td><td>10</td></tr>
<tr><td>4</td><td>a) Consider the following five processes, with the length of the CPU burst time given in milliseconds. Find Average Waiting Time and Turnaround time for given process using FCFS algorithm?
<table><tr><th>Process</th><th>Burst Time</th></tr><tr><td>P0</td><td>4</td></tr><tr><td>P1</td><td>10</td></tr><tr><td>P2</td><td>7</td></tr><tr><td>P3</td><td>2</td></tr><tr><td>P4</td><td>5</td></tr></table></td><td>2</td><td>3</td><td>5</td></tr>
<tr><td></td><td>b) What is process scheduling, and why is it important in an operating system?</td><td>2</td><td>2</td><td>5</td></tr>
<tr><td>5</td><td>List and explain the different multithreading models?</td><td>2</td><td>2</td><td>10</td></tr>
<tr><td rowspan="2">6</td><td>a) Explain the role of thread libraries in thread management?</td><td>2</td><td>2</td><td>5</td></tr>
<tr><td>b) Consider the following five processes, with the length of the CPU burst time given in milliseconds. Find Average Waiting Time and Turnaround time for given process using SJF algorithm (non-preemptive)?
<table><tr><th>Process</th><th>Burst Time</th></tr><tr><td>P1</td><td>5</td></tr><tr><td>P2</td><td>3</td></tr><tr><td>P3</td><td>1</td></tr><tr><td>P4</td><td>3</td></tr><tr><td>P5</td><td>5</td></tr></table></td><td>2</td><td>3</td><td>5</td></tr>
<tr><td>7</td><td>Compare and contrast the following CPU scheduling algorithms: FCFS, SJF, and Round Robin?</td><td>2</td><td>2</td><td>10</td></tr>
<tr><td>8</td><td>What are the advantages of multiple processor scheduling in operating systems?</td><td>2</td><td>3</td><td>10</td></tr>
<tr><td rowspan="2">9</td><td>a) Explain inter-process communication?</td><td>2</td><td>2</td><td>5</td></tr>
<tr><td>b) Explain multiple processor scheduling?</td><td>2</td><td>3</td><td>5</td></tr>
<tr><td>10</td><td>Explain the different types of CPU scheduling algorithms?</td><td>2</td><td>3</td><td>10</td></tr>
<tr><td colspan="5">2 MARKS QUESTIONS</td></tr>
</table>

1	What is a process, and how is it different from a program?	**2**	**3**	**2**
2	List the main states of a process?	**2**	**2**	**2**
3	What are the three types of schedulers in an operating system?	**2**	**2**	**2**
4	Differentiate between preemptive and non-preemptive scheduling?	**2**	**2**	**2**
5	What happens when a process is terminated?	**2**	**3**	**2**
6	What is the difference between a parent process and a child process?	**2**	**2**	**2**
7	What is the purpose of inter-process communication (IPC)?	**2**	**2**	**2**
8	Differentiate between shared memory and message passing in IPC?	**2**	**2**	**2**
9	Define a thread and explain its importance?	**2**	**3**	**2**
10	Explain the many-to-one threading model?	**2**	**2**	**2**
MODULE-III				
1	Explain critical section problem in the context of synchronization?	**3**	**2**	**5**
2	How does Peterson's solution address the critical section problem?	**3**	**2**	**10**
3	a) What are semaphores, and how do they differ from mutex locks in managing synchronization?	**3**	**2**	**5**
	b) What is the purpose of the wait and signal operations in semaphore-based synchronization?	**3**	**2**	**5**
4	What is the producer-consumer problem, and how can semaphores be used to solve it?	**3**	**2**	**10**
5	a) What is the system model in the context of deadlocks?	**3**	**1**	**2**
	b) Explain deadlock characterization, and how is it useful in identifying deadlock situations?	**3**	**2**	**08**
6	Explain with an example the Banker's algorithm for deadlock avoidance?	**3**	**2**	**10**
7	What is the difference between deadlock detection and deadlock prevention in terms of system design?	**3**	**2**	**10**
8	a) What are the various recovery techniques that can be used when a deadlock is detected?	**3**	**2**	**5**
	b)What role does resource allocation play in deadlock avoidance strategies?	**3**	**2**	**5**
9	a) What are monitors in operating systems and how do they support synchronization?	**3**	**2**	**5**

	b) What are the classic problems of synchronization in operating systems?	**3**	**2**	**5**
10	a) What are the methods for handling deadlocks in operating systems?	**3**	**2**	**5**
	b) What are the methods for recovery from deadlock?	**3**	**2**	**5**
2 MARKS QUESTIONS				
1	What are the three requirements of a solution to the critical section problem?	**3**	**2**	**2**
2	How does Peterson's solution ensure mutual exclusion and progress?	**3**	**2**	**2**
3	What is the role of a mutex lock in process synchronization?	**3**	**2**	**2**
4	Differentiate between binary semaphores and counting semaphores?	**3**	**2**	**2**
5	How do monitors help in process synchronization?	**3**	**2**	**2**
6	What is the Dining Philosophers Problem, and why is it significant?	**3**	**2**	**2**
7	How is the Producer-Consumer problem solved using semaphores?	**3**	**2**	**2**
8	Define a deadlock and explain its four necessary conditions?	**3**	**2**	**2**
9	What is the difference between deadlock avoidance and deadlock prevention?	**3**	**2**	**2**
10	Explain the steps involved in detecting a deadlock in a system?	**3**	**2**	**2**
MODULE-IV				
1	What are the main goals of memory management in an operating system?	**4**	**2**	**10**
2	Explain contiguous memory allocation and its advantages and disadvantages?	**4**	**2**	**10**
3	a) Explain briefly about Thrashing?	**4**	**2**	**5**
	b) What is the role of a page table in translating logical addresses to physical addresses?	**4**	**2**	**5**
4	Explain page swapping, and how does it impact system performance?	**4**	**2**	**10**
5	a) What is virtual memory, and why is it needed in modern computing?	**4**	**2**	**5**
	b) Explain in detail about Paging?	**4**	**2**	**5**
6	Explain in detail about the structure of page table?	**4**	**2**	**10**
7	Explain in detail about page replacement?	**4**	**2**	**10**
8	Explain the concept of HDD scheduling?	**4**	**2**	**10**
9	Describe the process of demand paging in an operating system?	**4**	**2**	**10**
10	Write a short note on the overview of mass storage structure?	**4**	**2**	**10**
2 MARKS QUESTIONS				

1	What is contiguous memory allocation, and how does it manage memory?	**4**	**2**	**2**
2	Explain the difference between logical and physical addresses in memory management?	**4**	**2**	**2**
3	Describe the structure of a page table and its role in paging?	**4**	**2**	**2**
4	What is swapping, and when is it used in memory management?	**4**	**2**	**2**
5	What is virtual memory, and how does it extend physical memory?	**4**	**2**	**2**
6	What is thrashing, and how does it affect system performance?	**4**	**2**	**2**
7	What is copy-on-write, and how does it optimize memory usage in process creation?	**4**	**2**	**2**
8	Explain the purpose of page replacement algorithms in virtual memory management?	**4**	**2**	**2**
9	What are the main components of a mass storage structure?	**4**	**2**	**2**
10	What is the purpose of the seek time in HDD scheduling?	**4**	**2**	**2**
MODULE-V				
1	What is a file, and why is it an important concept in an operating system?	**5**	**2**	**10**
2	What is the role of file system operations in file management?	**5**	**2**	**10**
3	How are directories implemented in a file system, and what is the role of allocation methods?	**5**	**2**	**10**
4	How does the process of mounting a file system work in an operating system?	**5**	**2**	**10**
5	a) Describe free space management. List the methods required for free space management?	**5**	**2**	**5**
	b) Explain various files accessing methods?	**5**	**2**	**5**
6	Explain primary goals of protection in computer systems?	**5**	**2**	**10**
7	What are the principles of protection, and how do they contribute to secure systems?	**5**	**2**	**10**
8	What is the purpose of access matrix? Explain about access matrix with a neat diagram?	**5**	**2**	**10**
9	Explain file sharing in operating systems?	**5**	**2**	**10**
10	Explain Protection Rings and Domain of Protection in operating systems?	**5**	**2**	**10**
2 MARKS QUESTIONS				
1	What is the file concept, and how are files structured?	**5**	**2**	**2**

2	How does a hierarchical directory structure organize files?	**5**	**2**	**2**
3	What is the role of the file-system structure in managing data storage?	**5**	**2**	**2**
4	What are the main methods used to implement directories?	**5**	**2**	**2**
5	Compare the contiguous and linked allocation methods for file storage?	**5**	**2**	**2**
6	What is the purpose of file-system mounting, and how is it performed?	**5**	**2**	**2**
7	What is the difference between partitions and file-system mounting?	**5**	**2**	**2**
8	Explain how file sharing is managed in a multi-user system?	**5**	**2**	**2**
9	What are the main goals of protection in an operating system?	**5**	**2**	**2**
10	Explain the principle of least privilege in the context of protection?	**5**	**2**	**2**