PVP 20

Code: 20CS3401

II B.Tech - II Semester – Regular / Supplementary Examinations
MAY - 2024

OPERATING SYSTEMS
(COMPUTER SCIENCE & ENGINEERING)

Duration: 3 hours Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.
2. All parts of Question must be answered in one place.

BL – Blooms Level CO – Course Outcome

			BL	CO	Max. Marks
UNIT-I					
1	a)	What is a system call? Explain exactly how a system call switches a process to kernel mode during its execution and how is it switched back to user mode on return from a system call.	L2	CO1	7 M
	b)	Describe the differences between symmetric and asymmetric multiprocessing. What are the advantages and disadvantages of multiprocessor systems?	L2	CO1	7 M
OR					
2	a)	Differentiate between computer system organization and computer system architecture.	L2	CO1	7 M
	b)	Discuss about system calls with examples.	L2	CO1	7 M

<table>
<tr><th colspan="6">UNIT-II</th></tr>
<tr><td rowspan="2">3</td><td>a)</td><td>Describe the life cycle of a process in detail, including the states it transitions through and the events triggering these transitions. Explain how the operating system manages processes, including process scheduling, creation, termination and communication.</td><td>L2</td><td>CO1</td><td>10 M</td></tr>
<tr><td>b)</td><td>Discuss the differences between threads and processes in an operating system. Explain the advantages and disadvantages of using threads compared to processes and provide examples of scenarios where each would be more suitable.</td><td>L3</td><td>CO2</td><td>4 M</td></tr>
<tr><td colspan="6">OR</td></tr>
<tr><td rowspan="2">4</td><td>a)</td><td>Discuss the pros and cons of the single core system and multi core system in detail.</td><td>L2</td><td>CO1</td><td>5 M</td></tr>
<tr><td>b)</td><td>Write the important characteristics of Round Robin Scheduling algorithm. And demonstrate its performance for the following workload in a system with time quantum = 2 units. Consider the set of 5 processes whose arrival time and burst time are given below:
<table>
<tr><th>Process ID</th><th>Arrival Time</th><th>Burst Time</th></tr>
<tr><td>P1</td><td>5</td><td>5</td></tr>
<tr><td>P2</td><td>4</td><td>6</td></tr>
<tr><td>P3</td><td>3</td><td>7</td></tr>
<tr><td>P4</td><td>1</td><td>9</td></tr>
</table>
</td><td>L3</td><td>CO2</td><td>9 M</td></tr>
</table>

		<table><tr><td>P5</td><td>2</td><td>2</td></tr><tr><td>P6</td><td>6</td><td>3</td></tr></table> Draw a Gantt chart illustrating the execution of these jobs and calculate the average waiting and average turnaround times.			
UNIT-III					
5	a)	Interpret how Banker's algorithm addresses the problem of deadlock avoidance in resource allocation and its significance in ensuring system stability.	L3	CO3	7 M
	b)	What is meant by Starvation in Dining philosopher problem? Suggest a solution to solve this problem by applying Semaphores.	L3	CO3	7 M
OR					
6	a)	Describe various synchronization mechanisms, such as semaphores, mutexes, and monitors.	L2	CO1	7 M
	b)	What is the purpose of safety algorithm? Interpret in detail.	L3	CO3	7 M
UNIT-IV					
7	a)	Discuss the advantages, challenges, and trade-offs associated with demand paging compared to other memory management techniques.	L4	CO4	7 M
	b)	Explain the concept of the Thrashing in detail.	L2	CO1	7 M
OR					

8	a)	Consider a paging hardware with a TLB. Assume that the entire page table and all the pages are in the physical memory. It takes 10 milliseconds to search the TLB and 80 milliseconds to access the physical memory. If the TLB hit ratio is 0.6, calculate the effective memory access time by giving detailed explanation.	L3	CO2	4 M
	b)	Illustrate Least Recently Used (LRU) page replacement algorithm in detail, including its principles, implementation strategies, and significance in operating system memory management.	L4	CO4	10 M
UNIT-V					
9	a)	Discuss the hierarchical structure of a file system and the functions of directories, files and file operations.	L4	CO4	7 M
	b)	Explain the significance of disk scheduling in operating systems, outlining the challenges it addresses and the goals it aims to achieve.	L2	CO1	7 M
OR					
10	a)	Describe various file access methods.	L2	CO1	7 M
	b)	Distinguish between various Disk-scheduling algorithms.	L4	CO4	7 M