B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

September / October 2024 Supplementary Examinations

Programme: B.E.   **Semester: IV**
Branch: Computer Science & Engineering   **Duration: 3 hrs.**
Course Code: 22CS4PCOPS   **Max Marks: 100**
Course: Operating Systems

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
                        2. Missing data, if any, may be suitably assumed.

<table>
<tr><td rowspan="18" style="writing-mode:vertical-rl">Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.</td><td colspan="3" align="center">UNIT - I</td><td>CO</td><td>PO</td><td>Marks</td></tr>
<tr><td>1</td><td>a)</td><td>Describe all operating system services.</td><td>CO1</td><td>PO1</td><td>10</td></tr>
<tr><td></td><td>b)</td><td>Describe system call, with an example of copy system call in detail.</td><td>CO1</td><td>PO1</td><td>10</td></tr>
<tr><td colspan="3" align="center">UNIT - II</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td>a)</td><td>Analyze all Multithreading Models, with threading issues.</td><td>CO2</td><td>PO2</td><td>10</td></tr>
<tr><td></td><td>b)</td><td>

process	Burst-Time	priority
P1	7	3
P2	2	2
P3	3	1
P4	1	1
P5	3	3

Lowest Number indicates LARGEST PRTY
(a) Draw Gantt chart for SJF, PRIORITY & RR(TQ=1)
(b) Compute the waiting time in each of 3 schedules in (a) & find which of them provides results in minimal AVG waiting time & AVG Turnaround Time.
(c) Find out the time of which there are maximum number of processes in READY Q in the above scenario.

</td><td>CO3</td><td>PO3</td><td>10</td></tr>
<tr><td colspan="3" align="center">UNIT - III</td><td></td><td></td><td></td></tr>
<tr><td>3</td><td>a)</td><td>Write a C program for Producer_ consumer using Semaphores.</td><td>CO3</td><td>PO3</td><td>10</td></tr>
<tr><td></td><td>b)</td><td>Assume that there are 5 processes, P0 through P4, and 4 types of resources (A, B, C, D) and the maximum number of instances for the following resources are 3, 17, 16, 12 respectively. Following table shows the resource allocation state at the current instance:</td><td>CO2</td><td>PO2</td><td>10</td></tr>
</table>

Given Matrices

	Allocation Matrix (N0 of the allocated resources By a process)				Max Matrix Max resources that may be used by a process			
	A	**B**	**C**	**D**	**A**	**B**	**C**	**D**
P0	0	1	1	0	0	2	1	0
P1	1	2	3	1	1	6	5	2
P2	1	3	6	5	2	3	6	6
P3	0	6	3	2	0	6	5	2
P4	0	0	1	4	0	6	5	6
Total	2	12	14	12				

i) Use the safety algorithm to test if the system is in a safe state or not?

ii) If the system is in a safe state, can the following requests be granted, why or why not? P1 requests (0,2,1,0)

			UNIT - IV			
4	a)	Write C program on First Fit memory allocation.	CO3	PO3	**10**
	b)	With neat diagram describe about segmentation hardware.	CO1	PO1	**10**
			OR			
5	a)	With neat diagram describe the steps in handling page fault.	CO1	PO1	**10**
	b)	Use the reference string : 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 For a memory with three frames obtain the page faults and analyse them for: i) FIFO ii) Optimal iii) LRU	CO2	PO2	**10**
			UNIT - V			
6	a)	Describe all File Allocation methods.	CO1	PO1	**10**
	b)	Describe any two directory implementation with neat diagrams.	CO1	PO1	**10**
			OR			
7	a)	With neat diagram describe moving head mechanism of disk.	CO1	PO1	**10**
	b)	Consider, for example, a disk queue with requests for I/O, for blocks on cylinders: 98, 183, 37, 122, 14, 124, 65, 67 R/W head is at 53 currently. Also it is moving towards left direction. Find total number of cylinder movement for below algorithms i) FCFS ii) SSTF iii) SCAN The maximum number of cylinders is 199. Analyze which is best among them.	CO2	P23	**10**

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