U.S.N.										

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

Autonomous Institute Affiliated to VTU

October 2024 Supplementary Examinations

Programme: B.E. **Semester: IV**
Branch: Computer Science and Engineering **Duration: 3 hrs.**
Course Code: 23CS4PCOPS **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.

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.

		UNIT - I	CO	PO	Marks
1	a)	Illustrate the different functions that does not help the user but ensures the efficient operations of system.	CO1	PO1	6
	b)	Write a C-program to create a process using UNIX -fork () system call.	CO1	PO1	6
	c)	Describe the different reasons which allows process co-operation.	CO1	PO1	8
		UNIT - II			
2	a)	The following processes are scheduled using Priority, RR algorithms. Each process is assigned a numerical priority with high number indicates high priority. In addition to the listed process system also has an idle task (which consumes no CPU resources & is identified as P-idle.)-This task has priority-0 & is scheduled whenever the system has no other available processes to run. The length of TQ=10units. If a process is preempted by a higher priority process, the preempted process is placed at the end of Q. (a) show the scheduling order of the processes using Gantt chart. (b) What is the TAT & WT for each process (c) What is the CPU UTILIZATION rate.	CO2	PO2	10

Process	priority	Burst-Time	arrival
P1	40	20	0
P2	30	25	25
P3	30	25	30
P4	35	15	60
P5	5	10	100
P6	10	10	105

		b)	<table><tr><td>Process</td><td>Execution-Time</td><td>Period</td></tr><tr><td>P1</td><td>3</td><td>20</td></tr><tr><td>P2</td><td>2</td><td>5</td></tr><tr><td>P3</td><td>2</td><td>10</td></tr></table> Using Rate-Monotonic Scheduling, Draw The Gantt Chart, Calculate The CPU-Utilization.	***CO2***	***PO2***	**5**
		C)	<table><tr><td>Process</td><td>Execution-Time</td><td>Period</td></tr><tr><td>P1</td><td>1</td><td>3</td></tr><tr><td>P2</td><td>1</td><td>4</td></tr><tr><td>P3</td><td>2</td><td>8</td></tr></table> Using Earliest-Dead-Line-First Scheduling, Draw The Gantt Chart, Calculate The CPU-Utilization.	***CO2***	***PO2***	**5**
			UNIT - III			
	3	a)	Write the structure of philosopher and justify whether that structure generates the problems or not with the help of example. Provide the semaphore solution to the pair of philosophers that can eat independently.	***CO2***	***PO2***	**10**
		b)	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: <table><tr><td colspan="9"><u>Given Matrices</u></td></tr><tr><td></td><td colspan="4"><u>Allocation Matrix</u> (N0 of the allocated resources By a process)</td><td colspan="4"><u>Max Matrix</u> Max resources that may be used by a process</td></tr><tr><td></td><td>A</td><td>B</td><td>C</td><td>D</td><td>A</td><td>B</td><td>C</td><td>D</td></tr><tr><td>P_0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>2</td><td>1</td><td>0</td></tr><tr><td>P_1</td><td>1</td><td>2</td><td>3</td><td>1</td><td>1</td><td>6</td><td>5</td><td>2</td></tr><tr><td>P_2</td><td>1</td><td>3</td><td>6</td><td>5</td><td>2</td><td>3</td><td>6</td><td>6</td></tr><tr><td>P_3</td><td>0</td><td>6</td><td>3</td><td>2</td><td>0</td><td>6</td><td>5</td><td>2</td></tr><tr><td>P_4</td><td>0</td><td>0</td><td>1</td><td>4</td><td>0</td><td>6</td><td>5</td><td>6</td></tr><tr><td>Total</td><td>2</td><td>12</td><td>14</td><td>12</td><td></td><td></td><td></td><td></td></tr></table> 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)	***CO2***	***PO2***	**10**
			UNIT - IV			
	4	a)	Describe the steps involved in handling page faults in a demand paging system with a neat diagram.	***CO3***	***PO3***	**5**
		b)	Given references to the following pages by a program, 0,9,0,1,8,1,8,7,8,7,1,2,8,2,7,8,2,3,8,3 how many page faults will occur if the program has 3-page frames available to it and uses FIFO, LRU, OPTIMAL page replacement Algorithms.	***CO3***	***PO3***	**10**

		c)	Given a memory partition 200k, 700k, 100k, 400k, apply first fit, best fit, worst fit to place 315k, 427k, 250k, 550k. Which algorithm makes the most efficient use of memory?	***CO3***	***PO3***	**5**
			OR			
	5	a)	On a system using simple segmentation, compute the physical address for each of the logical addresses. If the address generates segment fault, indicate so. Segment | Base | Length 0 | 330 | 124 1 | 876 | 211 2 | 111 | 99 3 | 498 | 302 (i)0,99 (ii) 2,78 (iii) 1,265 (iv) 3,222 (v) 0,111	***CO2***	***PO2***	**10**
		b)	Given references to the following pages by a program,0,1,4,2,0,2,6,5,1,2,3,2,1,2,6,2,1,3,6,2 how many page faults will occur if the program has 3-page frames available to it and uses FIFO, LRU, OPTIMAL page replacement Algorithms.	***CO3***	***PO3***	**10**
			UNIT - V			
	6	a)	On a disk with 1000 cylinders, numbered 0-999, compute the number of tracks the disk arm must move to satisfy all the requests in the disk q. Assume the last request serviced was at track 345 and the head is moving toward track 0. The q in FIFO order contains requests for the following tracks: 123, 874, 692, 475,105,376. Perform the computations for the following scheduling algorithms with diagram. FIFO, SSTF, SCAN, LOOK, C-SCAN, C-LOOK.	***CO3***	***PO3***	**10**
		b)	Explain the Different approaches of free space management.	***CO1***	***PO1***	**10**
			OR			
	7	a)	On a disk with 1000 cylinders, numbered 0-999, compute the number of tracks the disk arm must move to satisfy all the requests in the disk q. Assume the last request serviced was at track 756 and the head is moving toward track 0. The q in FIFO order contains requests for the following tracks: 811, 348, 153, 968, 407, 500. Perform the computations for the following scheduling algorithms with diagram. –FIFO, SSTF, SCAN, LOOK, C-SCAN, C-LOOK.	***CO3***	***PO3***	**10**
		b)	Explain the different File-Allocation Methods.	***CO1***	***PO1***	**10**

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