



Daffodil International University
Department of Software Engineering
Faculty of Science & Information Technology
Final Examination, Spring 2024
Course Code: SE232; Course Title: Operating System & System
Programming
Sections & Teachers: All

Time: 2:00 Hrs

Marks: 40

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1	Consider the set of 6 processes whose arrival time and burst time is given																							
	<table><tr><th>Process ID</th><th>Arrival Time</th><th>Burst Time</th></tr><tr><td>P1</td><td>1</td><td>7</td></tr><tr><td>P2</td><td>2</td><td>5</td></tr><tr><td>P3</td><td>0</td><td>3</td></tr><tr><td>P4</td><td>3</td><td>1</td></tr><tr><td>P5</td><td>4</td><td>2</td></tr><tr><td>P6</td><td>5</td><td>1</td></tr></table>	Process ID	Arrival Time	Burst Time	P1	1	7	P2	2	5	P3	0	3	P4	3	1	P5	4	2	P6	5	1		
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	a) Apply the algorithm that has the minimum average waiting time to find out the average waiting time and turn-around time.	Marks [5]	CLO-2 Level-3																					
	b) Demonstrate the concept of solving the mutual exclusion problem in a critical section using semaphores.	Marks [5]																						
2	a) Illustrate the segmentation concept with the diagram in detail.	Marks [5]	CLO-3 Level-4																					

	b) A system has 4 processes and 5 allocable resources. The current allocation and maximum needs are as follows. total number of resources A, B, C, D, and E are 11, 7, 3, 6, 4. <table border="1"> <tr> <th></th> <th colspan="5">Allocated</th> <th colspan="5">Maximum Needs</th> </tr> <tr> <td>P1</td> <td>0</td> <td>1</td> <td>0</td> <td>1</td> <td>0</td> <td>2</td> <td>1</td> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>P2</td> <td>2</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>3</td> <td>3</td> <td>1</td> <td>2</td> <td>2</td> </tr> <tr> <td>P3</td> <td>3</td> <td>0</td> <td>2</td> <td>1</td> <td>0</td> <td>4</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> </tr> <tr> <td>P4</td> <td>2</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>2</td> <td>2</td> <td>1</td> <td>2</td> <td>1</td> </tr> </table> Identify if the system is in a safe state or not with the sequence.		Allocated					Maximum Needs					P1	0	1	0	1	0	2	1	0	1	0	P2	2	0	0	0	1	3	3	1	2	2	P3	3	0	2	1	0	4	1	1	1	1	P4	2	1	1	1	1	2	2	1	2	1	Marks [6]	
	Allocated					Maximum Needs																																																				
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P4	2	1	1	1	1	2	2	1	2	1																																																
	c) <table> <tr> <th></th> <th>Allocation</th> <th>Max</th> <th>Available</th> </tr> <tr> <th></th> <th>A B C D</th> <th>A B C D</th> <th>A B C D</th> </tr> <tr> <td>P1</td> <td>0 0 1 2</td> <td>0 0 1 2</td> <td>3 3 1 2</td> </tr> <tr> <td>P2</td> <td>1 0 0 0</td> <td>1 4 5 0</td> <td></td> </tr> <tr> <td>P3</td> <td>1 3 5 4</td> <td>2 3 5 6</td> <td></td> </tr> </table> Analyze If a request from process P3 arrives for (1,i,1,1), can the request be granted immediately?		Allocation	Max	Available		A B C D	A B C D	A B C D	P1	0 0 1 2	0 0 1 2	3 3 1 2	P2	1 0 0 0	1 4 5 0		P3	1 3 5 4	2 3 5 6		Marks [4]																																				
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	d) Consider six memory partitions of size 200 KB, 400 KB, 600 KB, 500 KB, 300 KB 310 KB, and 250 KB. These partitions need to be allocated to five processes of sizes 357 KB, 210 KB, 468 KB, 300 KB, and 491 KB in that order. Apply the contiguous memory allocation of processes using- - First Fit Algorithm - Best Fit Algorithm - Worst Fit Algorithm	Marks [5]																																																								
3	a) Identify the advantages and disadvantages of RAID in operating systems.	Marks [5]	CLO-4 Level-3																																																							
	b) Apply SCAN algorithm to calculate the total seek time using for the given scenario: Request sequence = {176, 79, 34, 60, 92, 11, 41, 114} Disk range (2-250) Initial head position = 50; Direction = right	Marks [5]																																																								