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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 Process ID | Arrival Time | Burst Time P1 | 1 | 7 P2 | 2 | 5 P3 | 0 | 3 P4 | 3 | 1 P5 | 4 | 2 P6 | 5 | 1		
	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

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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.

Marks [6]

	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

Identify if the system is in a safe state or not with the sequence.

c) Marks [4]

	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	

Analyze If a request from process P3 arrives for (1,1,1,1), can the request be granted immediately?

d) Marks [5]

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-

i. First Fit Algorithm
ii. Best Fit Algorithm
iii. Worst Fit Algorithm

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: Marks [5]

Request sequence = {176, 79, 34, 60, 92, 11, 41, 114} Disk range (2-250)

Initial head position = 50;

Direction = right