

Branch: AI-DS
 Subject: Operating System
 SEM: IV
 Correction in
 Q.4 ii) new process with size is given as
 2K,8K,4K,5K,6K

K. J. Somaiya Institute of Engineering and Information Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

End Semester Exam

April - May 2022

(B.Tech) Program: Artificial Intelligence and Data Science

Examination: SY Semester: IV

Course Code: IUAIC404 and Course Name: Operating System

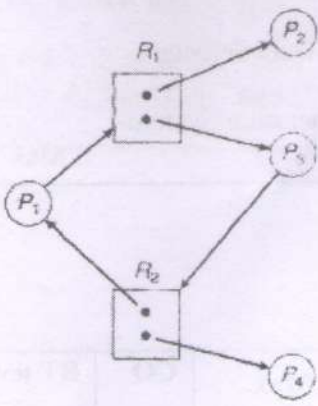
Duration: 03 Hours

Max. Marks: 60

Instructions:

- (1) All questions are compulsory.
- (2) Draw neat diagrams wherever applicable.
- (3) Assume suitable data, if necessary.

		Max. Marks	CO	BT level
Q 1	Solve any six questions out of eight:	12		
i)	What are the operating system responsibilities for Memory management?	2	CO1	Understanding
ii)	List types of scheduling algorithms and briefly define anyone.	2	CO2	Remembering
iii)	Show that, if the wait() and signal() semaphore operations are not executed automatically, then mutual exclusion may be violated.	2	CO3	Understanding
iv)	What are the different methods of deadlock prevention?	2	CO3	Understanding
v)	What are the distinctions among logical, relative and physical addresses?	2	CO4	Understanding
vi)	What is the difference between a page and a segment?	2	CO4	Understanding
vii)	What is a Two level directory?	2	CO5	Understanding
viii)	Define disk scheduling and list type of disk scheduling algorithms.	2	CO6	Remembering

Q.2	Solve any four questions out of six.	16		
i)	Explain in detail Linux shell with its types?	4	CO1	Understanding
ii)	Explain thread with help of suitable examples.	4	CO2	Understanding
iii)	 <p>In above RAG, Find if the system is in a deadlock state otherwise find a safe sequence.</p>	4	CO3	Analyzing
iv)	What is the difference between internal and external fragmentation?	4	CO4	Understanding
v)	Write short on "File structure"	4	CO5	Understanding
vi)	What is the difference between logical I/O and device I/O?	4	CO6	Understanding
Q.3	Solve any two questions out of three.	16		
i)	Explain in detail the producer-consumer problem with examples.	8	CO3	Understanding
ii)	Explain multithreading and its models.	8	CO2	Apply
iii)	<p>Given the following state for the Banker's Algorithm.</p> <p>6 processes P0 through P5</p> <p>4 resource types: A(15 instances) ; B(6 instances);C(9 instances);D(10 instances)</p>	8	CO3	Understanding

Snapshot at time T0:

Available

6	3	5	4
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Process	Current allocation				Maximum demand			
	A	B	C	D	A	B	C	D
P0	2	0	2	1	9	5	5	5
P1	0	1	1	1	2	2	3	3
P2	4	1	0	2	7	5	4	4
P3	1	0	0	1	3	3	3	2
P4	1	1	0	0	5	2	2	1
P5	1	0	1	1	4	4	4	4

- Calculate the Need matrix.
- Show that the current state is safe, that is, show a safe sequence of processes.
- Given the request (3,2,3,3) from Process P5. Should this request be granted? Why or why not?

Q.4	Solve any two questions out of three.	16		
i)	<p>What is the need of page replacement? Consider following reference string</p> <p>8,1,2,3,1,4,1,5,3,4,1,4,3,2,3,1,2,8,1,2</p> <p>Find the number of Page Faults with FIFO, LRU, optimal page replacement with THREE frames which are empty initially. Which algorithm gives the minimum number of page faults.</p>	8	CO4	Apply
ii)	<p>A variable partition memory system has at some point in time the following holes sizes in the given order: -20K,15K,40K,60K,10K,25K. A new process is to be</p>	8	CO4	Apply

	loaded. Which hole size would be filled using best-fit, first-fit and worst fit respectively?			
iii)	<p>Consider a disk with 200 tracks and the queue has random requests from different processes in the order: 55, 58, 39, 18, 90, 160, 150, 38, 184</p> <p>Initially the arm is at 100. Find the Average Seek length using FIFO, SSTF, SCAN and C-SCAN algorithm.</p>	8	CO6	Apply