Question Paper

MANIPAL ACADEMY OF HIGHER EDUCATION

FIFTH SEMESTER B.TECH. DEGREE EXAMINATIONS - NOVEMBER / DECEMBER 2023
SUBJECT: CSE 3153- OPERATING SYSTEMS

Marks: 50   **Duration: 180 mins.**
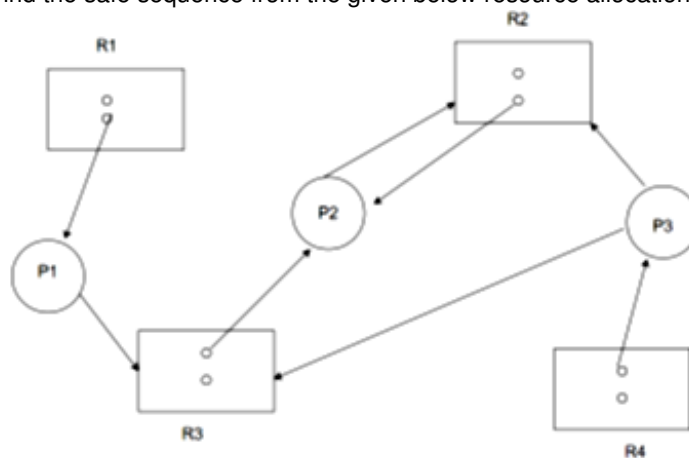
Answer all the questions.

1A)	What is TCB? Explain about the different information associated with a specific process.	(4)
1B)	Explain different states in process lifecycle.	(3)
1C)	Define critical section problem with a general structure of a process. Explain the different requirements to solve the critical section problem.	(3)
2A)	Consider the set of 4 processes whose arrival time and burst time are given below-	(4)

Process No.	Arrival Time	Burst Time		
		CPU Burst	I/O Burst	CPU Burst
P1	0	3	2	2
P2	0	2	4	1
P3	2	1	3	2
P4	5	2	2	1

Calculate the average waiting time and average turnaround time using Shortest Remaining Time First CPU scheduling algorithm.

2B)	Find the safe sequence from the given below resource allocation graph using Banker's algorithm.	(3)

2C)	Distinguish between paging and segmentation.	(3)
3A)	Explain the different ways in which the access matrix is implemented. Also compare and contrast them.	(5)
3B)	i) Give at least 6 common file types along and their extension.	(5)
	ii) Should the operating system maintain a separate table for each user or maintain just one table	

that contains references to files that are currently being accessed by all users? If the same file is being accessed by two different programs or users, should there be separate entries in the open-file table? Explain.

(3+2 = 5 marks)

4A)	Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (in order), how would each of the first-fit, best-fit, and worst-fit algorithms place processes of 212 KB, 417 KB, 112 KB, and 426 KB (in order)? Which algorithm makes the most efficient use of memory?	(4)
4B)	"The number of frames becomes directly proportional to the number of page faults". Analyze this situation and demonstrate it with examples.	(4)
4C)	Elaborate the role of memory protection to convert logical address space to physical address space	(2)
5A)	Explain the three different algorithms that approximate the LRU page replacement algorithm.	(4)
5B)	State precisely the Seek time, rotational latency and bandwidth with respect to disk scheduling. Mention all the information hidden in the system call when the process makes I/O to or from disk. Analyse the differences between scan and C scan disk scheduling algorithms.	(4)
5C)	Justify the statement "The effective access time will increase even in case of local replacement algorithm which is used to prevent thrashing"	(2)

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