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TERM END EXAMINATIONS (TEE) – December 2021

Programme	: B.Tech – BCE, BCG	Semester	: Fall 2021-22
Course Name	: Operating System	Course Code	: CSE3003
Faculty Name	: Dr. Abha Trivedi	Slot / Class No	: C11+C12+C13/0431
Time	: 1½ hours	Max. Marks	: 50

Answer ALL the Questions

Q. No.	Question Description	Marks
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PART - A (30 Marks)

- 1 (a) Justify the statement “Operating System can be viewed as a government, resource allocator and a control program” in terms of different services provided by the OS. (10)

OR

- (b) Write the function definitions of producer and consumer modules in the algorithm designed to solve Producer Consumer problem using Monitors. Take possible cases and draw a neat diagram to illustrate the working of producer-consumer modules. 4+6 (10)

- 2 (a) You are using dynamic contiguous memory allocation with a memory user space of 2000K. These are the processes P1=402K, P2=327K, P3=112K, P4=526K and P5=278 K arrived. Allocation should be done in the given order of arrival. Answer the following: (10)

- Show the allocation and Leftover memory space 3
- P6=245K arrived, can it be allocated? If yes where and how much will be the leftover memory space now. 2
- Let's say, P3 and P5 left (emptied the location). P7=75K arrived, where it can be accommodated among all the free spaces if using First Fit, Best Fit and Worst Fit? (show separate diagram for each). 3
- After allocation done in (c), with whichever scheme, if P8=280K arrived will it lead to internal fragmentation or external fragmentation 2

OR

- (b) Given 4 processes A, B, C and D; X and Y are multi-instance resources (2 instances for each) and Z is single instance resource; and following events happen in the sequence as given, (10)

i) A requests X, B requests Y, D requests Y, C requests Z, B requests Z, D requests Z, A requests Y, D requests X 5

ii) A requests X, B requests Y, C requests Y, D requests Z, C requests Z, A requests Y, D requests X, B requests X, D requests Y 5

Assuming that initially all resources are free and once requested gets allocated to the requesting process if it is available. Draw the multi- instance resource allocation graph for the sequences. Also, mention whether it is a deadlock or not, justify if yes or if no?

(Note: Follow the sequence as given to allocate the resources)

- 3 (a) The queue of requests for the disk access with 200 tracks by the processes is: (10)

100, 28, 72, 40, 185, 25, 160, 8, 145

Current head position is 55. What is the total head movement needed to satisfy the requests for the following Scheduling algorithms SSTF and C-SCAN (for C-SCAN, R/W head initiate its movement towards the increasing track number)? 5

OR

- (b) Distinguish among the following: (10)

i) Contiguous and Linked File Allocation Methods 5

ii) Direct and Indexed file access methods 5

PART - B (20 Marks)

- 4 At certain time t , the state of the system is as given below with their maximum need and Allocation of resources: (10)

Process	Max			Allocation		
	A	B	C	A	B	C
P0	5	2	4	2	1	1
P1	2	7	0	0	3	0
P2	0	3	6	0	1	4

In the system, total available resources of type A, B and C are 5, 7 and 7. Using Banker's algorithm, answer the following:

a) Determine whether the system is in safe state or not? If it is, find the safe sequence.

b) Let's say, now process P0 requested for resources A, B, C as 1, 1, 2. The request should be granted or not? Justify

- 5 Assuming there are 3 frames and the page reference string is (10)

3 2 1 3 4 1 6 2 4 3 4 2 1 4 5

Compute number of page faults and number of hits with the following page replacement algorithms: LRU and Optimal. Also, give the hit ratio and page fault ratio. 5

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