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1406E500

Candidate's Seat No :_____

MCA Semester 2 Examination

Operating Systems

June-2024

Time : 3-00 Hours] **[Max. Marks : 50**

Instructions:

- **Write both the Sections in the separate answer book.**
- **Both Sections having equal weightage.**
- **Draw Diagrams wherever necessary.**
- **Make Assumptions wherever necessary.**

SECTION – I

Q-1 **Explain the following terms with an appropriate example.** **9**

1) Thrashing
2) Fragmentation
3) Belady's Anomaly

Q-2 **Attempt the following.** **8**

1) What is system call? List the system call sequence to copy the contents of one file to another file.
2) What is inter process communication? Explain the models for inter process communication.

OR

Q-2 **Attempt the following.**

1) What is race condition? Explain Critical-Section Problem in detail.
2) Mention the Scheduling Criteria and Optimization Criteria for Scheduling algorithm? Brief about each.

Q-3 **Attempt the following.** **8**

1) Consider the following data for the system for five processes and three resources. Use Banker's algorithm and answer the questions

Processes	Allocation A B C	Max A B C	Available A B C
P0	1 1 2	4 3 3	2 1 0
P1	2 1 2	3 2 2	
P2	4 0 1	9 0 2	
P3	0 2 0	7 5 3	
P4	1 1 2	1 1 2	

a. Calculate the matrix need.
b. What will be the safe sequence?
c. Is the system being in safe state?

(P.T.O)

d. If Pi arrives with request(7,3,6) after P2, can it be granted immediately?

2) Why we require process to be synchronized? Explain any one process synchronization problem.

SECTION – II

Q-4 What is semaphore? Briefly explain different type of semaphore(S). **07**

If S=12 and P() operation performed 6 times and V() operation performed 8 time. What will be the value of S?

Q-5 **Attempt the following.(Any Two)** **10**

1. Process and its corresponding burst time and arrival time is given. Mention the Gantt Chart and Find the average turnaround time and average waiting time for FCFS, SJF(Preemptive and Non-preemptive), Round Robin(Quantum Time = 3ms) and Priority based (Non-preemptive) algorithm. Also mention which algorithm will be best.

Process	Arrival Time	Burst Time	Priority
P1	0	7	2
P2	2	3	3
P3	4	2	1
P4	5	5	3

2. A disk system has 75(0-74) cylinders, the read/write head is at cylinder 37 and determine the order of head movement for FCFS, SSTF and C-SCAN to satisfy the following stream of request. Also answer followings:

    1. Total head travel distance
    2. What is the time taken to satisfy all the requests if it takes 0.7 milliseconds to move from one cylinder to an adjacent one?
    3. Which algorithm is better?

    Disk request : 12, 20, 25, 70, 41, 61, 38, 40, 63

3. Estimate the Number of page faults for the following page reference string for frame size 3:
    7, 0, 1, 2, 0, 3, 4, 0, 2, 3, 0, 1, 2, 0,1, 7, 0,1,3,0,2
    Use FIFO, Optimal and LRU Algorithms.
    Which Algorithm performs better?

Q-6 **Attempt the following. (Any Two)** **08**

1) What is directory? Explain different directory Structure in detail.
2) What is RAID? List out and explain advantage and disadvantage of RAID.
3) What is the Critical-Section Problem? Which are the requirements for solution to critical-section problem?

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