

SVKM'S NMIMS

MUKESH PATEL SCHOOL OF TECHNOLOGY MANAGEMENT ENGINEERING /
SCHOOL OF TECHNOLOGY MANAGEMENT ENGINEERINGProgram: B. Tech (AI / AI & DS/ AI & ML/ Computer) & MBA
Tech (AI/ Computer)

Year: II/III

Semester : III/V

Academic Year: 2022-2023

Subject: Operating Systems

Marks: 100

Time: 10.00 am - 1.00 pm

Date : 04 February 2023

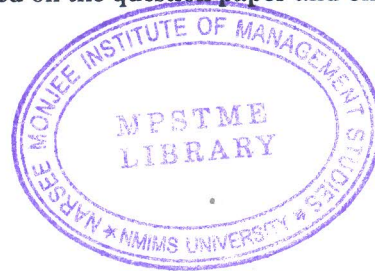
Durations: 3 (Hrs)

No. of Pages: 2

Re-Examination (2022-23)

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) Question No. _1_ is compulsory.
- 2) Out of remaining questions, attempt any _4_ questions.
- 3) In all _5_ questions to be attempted.
- 4) All questions carry equal marks.
- 5) Answer to each new question to be started on a fresh page.
- 6) Figures in brackets on the right hand side indicate full marks.
- 7) Assume Suitable data if necessary.



Assume suitable data if necessary.																		
Q1		Answer briefly:	[20]															
CO-2; SO-1,6; BL-2	a.	Explain critical section problem in detail.	[05]															
CO-3; SO-6; BL-3	b.	What are the procedures that I/O subsystem supervises?	[05]															
CO-2; SO-1,6; BL-1	c.	Explain the difference between long term and short term and medium term schedulers.	[05]															
CO-3; SO-1,6; BL-3	d.	What do you understand by context switching? Explain swapping of two processes in detail with diagram.	[05]															
Q2																		
CO-2; SO-1,6; BL-5	a.	Identify the problem associated with bounded buffer. How to solve this problem using semaphore elaborate with suitable example?	[10]															
CO-3; SO-1,6; BL-3	b.	What is the need of page replacement algorithms? Elaborate all the types of page replacement algorithms. Find page faults in LRU algorithm for the order 6, 7, 8, 9, 6, 7, 1, 6, 7, 8, 9, 1, 7, 9, 6 with available frames as 3.	[10]															
Q3																		
CO-2; SO-1,6; BL-2	a.	What is difference between preemptive and non-preemptive CPU scheduling? Consider the following set of processes with the length of the CPU burst time given in milliseconds: <table><tr><td>Process</td><td>Burst Time</td><td>Arrival Time</td></tr><tr><td>P1</td><td>4</td><td>0</td></tr><tr><td>P2</td><td>2</td><td>1</td></tr><tr><td>P3</td><td>5</td><td>2</td></tr><tr><td>P4</td><td>4</td><td>3</td></tr></table>	Process	Burst Time	Arrival Time	P1	4	0	P2	2	1	P3	5	2	P4	4	3	[10]
			Process	Burst Time	Arrival Time													
			P1	4	0													
			P2	2	1													
			P3	5	2													
P4	4	3																

		Draw the Gantt chart for preemptive SJF and non-preemptive SJF scheduling. Calculate average waiting time and average turn-around time .																																											
CO-3; SO-1; BL-3	b.	Suppose the requests to be addressed are- 82,170,43,140,24,16,190. And the Read/Write arm is at 50, and it is also given that the disk arm should move “towards the larger value”. Find the number of head movements using: I. SSTF Algorithm II. LOOK Algorithm	[10]																																										
Q4																																													
CO-1; SO-1,6; BL-2	a.	Discuss the following in brief: I. Tightly Coupled Systems II. System Calls	[10]																																										
CO-3; SO-1; BL-1	b.	Define file and list various file attributes. Explain different allocation methods w.r.t contiguous allocation, linked allocation, indexed allocation.	[10]																																										
Q5																																													
CO-2; SO-1,6; BL-3	a.	Consider 3 processes P1, P2 and P3, which require 5, 7 and 4 time units and arrive at time 0, 1 and 3. Draw the Gant chart, process completion sequence and average waiting time for: I. Round robin scheduling with CPU quantum of 2 time units. II. FCFS	[10]																																										
CO-2; SO-2; BL-3	b.	I. A system of 4 processes (P0, P1, P2, and P3) with the following allocation and Max matrix in which only 3 instances of A and 3 instances of B are the only resources available at a particular instance. As per the following scenario, Will the system be in a Safe state? If yes, what is the Process termination sequence order? <table border="1"><thead><tr><th></th><th colspan="3">Allocation</th><th colspan="3">Max</th></tr><tr><th></th><th>A</th><th>B</th><th>C</th><th>A</th><th>B</th><th>C</th></tr></thead><tbody><tr><td>P0</td><td>1</td><td>0</td><td>1</td><td>4</td><td>3</td><td>1</td></tr><tr><td>P1</td><td>1</td><td>1</td><td>2</td><td>2</td><td>1</td><td>4</td></tr><tr><td>P2</td><td>1</td><td>0</td><td>3</td><td>1</td><td>3</td><td>3</td></tr><tr><td>P3</td><td>2</td><td>0</td><td>0</td><td>5</td><td>4</td><td>1</td></tr></tbody></table>		Allocation			Max				A	B	C	A	B	C	P0	1	0	1	4	3	1	P1	1	1	2	2	1	4	P2	1	0	3	1	3	3	P3	2	0	0	5	4	1	[06]
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CO-2; SO-2; BL-2		II. Explain the Safety algorithm in the context of Deadlock.	[04]																																										
Q6																																													
CO-3; SO-1,6; BL-3	a.	How will you implement segmentation in a user program having six segments? Depict logical address space, segmentation table and physical memory for the above using diagram. Also throw light on advantages and disadvantages of segmentation.	[10]																																										
CO-2; SO-1,6; BL-5	b.	Answer the following: I. Consider a counting semaphore is initialized with value 10. Evaluate a value of S after executing 6 times p() and 8 time v() function on S. II. Explain and write code of p () and v() i.e. wait () and signal(). III. List the problems which can be solved using semaphores, elaborate any one with solution.	[10]																																										
Q7																																													
CO-2; SO-2; BL-3	a.	Interpret the different methods to prevent the existence of a deadlock with respect to the reasons for it.	[10]																																										
CO-3; SO-1,6; BL-2	b.	Illustrate various techniques of address binding by means of a diagram.	[05]																																										
CO-2; SO-1,6; BL-1	c.	What is thread? what are different types of threads.	[05]																																										