

Date: 02/06/2022

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

End Semester Exam

May -June (2021-2022)

Program: B.Tech. Computer Engineering

Examination: SY Semester: IV

Course Code: IUCEC404 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)	List various functions of an Operating system	2	CO1	2																								
ii)	Sketch a neat diagram of various states of a process and explain each in brief.	2	CO2	3																								
iii)	Summarize various methods used for deadlock recovery	2	CO3	2																								
iv)	Consider page reference string 1, 3, 0, 3, 5, 6, 3 with 3-page frames. Find the number of page faults using LRU	2	CO4	3																								
v)	List file access methods in OS & explain any one in brief	2	CO5	2																								
vi)	Suppose the order of request is - (82,170,43,140,24,16,190) and current position of Read/Write head is: 50. Find total no of head movements using FCFS disk scheduling algorithm.	2	CO6	3																								
vii)	Illustrate the concept of PCB with a neat diagram.	2	CO2	2																								
viii)	Write a short note on Thrashing.	2	CO4	2																								
Q.2	Solve any four questions out of six.	16																										
i)	Define System calls & explain its categories with examples.	4	CO1	2																								
ii)	List various process scheduling policies. Explain Non-Preemptive SJF.	4	CO2	2																								
iii)	Analyze the principles of concurrency & list various issues.	4	CO3	3																								
iv)	Illustrate the concept of Fixed partitioning with the help of an example	4	CO4	3																								
v)	Discuss the advantages of indexed sequential file access method.	4	CO5	2																								
vi)	Explain DMA method of I/O Organization in brief with suitable diagram.	4	CO6	2																								
Q.3	Solve any two questions out of three.	16																										
i)	Sketch a neat diagram & explain Layered structure of an Operating system.	8	CO1	3																								
ii)	Discuss various memory allocation strategies in detail.	8	CO4	2																								
iii)	Explain types of File directories in OS in detail.	8	CO5	2																								
Q.4	Solve any two questions out of three.	16																										
i)	Consider the following five processes each having its own unique burst time and arrival time. Calculate their average waiting time using non-preemptive SJF.	8	CO2	3																								
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Process</th> <th>Queue</th> <th>Burst Time</th> <th>Arrival Time</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td></td> <td>6</td> <td>2</td> </tr> <tr> <td>P2</td> <td></td> <td>2</td> <td>5</td> </tr> <tr> <td>P3</td> <td></td> <td>8</td> <td>1</td> </tr> <tr> <td>P4</td> <td></td> <td>3</td> <td>0</td> </tr> <tr> <td>P5</td> <td></td> <td>4</td> <td>4</td> </tr> </tbody> </table>					Process	Queue	Burst Time	Arrival Time	P1		6	2	P2		2	5	P3		8	1	P4		3	0	P5		4	4
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ii)	1. Calculate the content of Need Matrix. 2. Check the system is in safe state or not using Banker's Algorithm? If yes, Write process sequence 3. Determine the total sum of each type of resource.	8	CO3	4																																																																					
<table border="1"> <thead> <tr> <th rowspan="2">Process</th> <th colspan="3">Allocation</th> <th colspan="3">Max</th> <th colspan="3">Available</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</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>1</td> <td>2</td> <td>4</td> <td>3</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td>P1</td> <td>2</td> <td>1</td> <td>2</td> <td>3</td> <td>2</td> <td>2</td> <td></td> <td></td> <td></td> </tr> <tr> <td>P2</td> <td>4</td> <td>0</td> <td>1</td> <td>9</td> <td>0</td> <td>2</td> <td></td> <td></td> <td></td> </tr> <tr> <td>P3</td> <td>0</td> <td>2</td> <td>0</td> <td>7</td> <td>5</td> <td>3</td> <td></td> <td></td> <td></td> </tr> <tr> <td>P4</td> <td>1</td> <td>1</td> <td>2</td> <td>1</td> <td>1</td> <td>2</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>					Process	Allocation			Max			Available			A	B	C	A	B	C	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			
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iii)	If the disk requests are 10,20,50,30,60,40,80. Current head position is 40. Calculate the total seek by disk head using C-scan and C-look disk scheduling algorithms and analyze the results.	8	CO6	4																																																																					

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P2	4 0 1	9 0 2	
P3	0 2 0	7 5 3	
P4	1 1 2	1 1 2	