
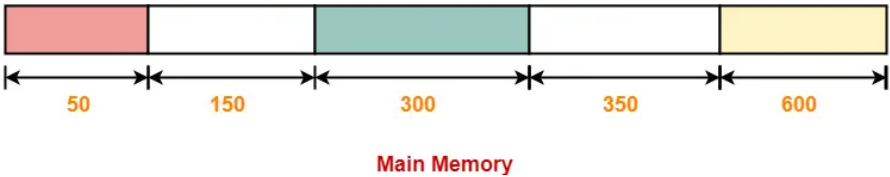


Name:			
Enrolment No:			
UPES End Semester Examination, May 2023			
Course: Operating System Program: BCA Course Code: CSBC1009		Semester: II Time : 03 hrs. Max. Marks: 100	
Instructions:			
SECTION A (5Qx4M=20Marks)			
S. No.		Marks	CO
Q 1	Differentiate between the logical address and physical address.	4	CO3
Q2	Mention five operating system functions.	4	CO1
Q3	Define Semaphore? Differentiate between binary and counting semaphore.	4	CO2
Q4	Define Ostrich Effect, which operating systems suffers from it?	4	CO4
Q5	Mention which memory management algorithms suffer from external fragmentation, explain with reason.	4	CO3
SECTION B (4Qx10M= 40 Marks)			
Q6	Consider the set of 5 processes whose priority, arrival time and burst time are given below-	10	CO2

Process Id	Arrival time	Burst time	Priority
P1	0	4	2
P2	1	3	3
P3	2	1	4
P4	3	5	5
P5	4	2	5

If the CPU scheduling policy is priority preemptive, calculate the average waiting time and average turnaround time.

Q7	Define deadlock? Mention the necessary four conditions which ensures occurrence of deadlock	10	CO4
Q8	Which scheduler is responsible for controlling the degree of multiprogramming in Operating System. Discuss in brief Non-Preemptive CPU Scheduling techniques.	10	CO2
Q9	<p>Consider the following figure in which blank regions are not in use and hatched regions are in use-</p>  <p style="text-align: center;">Main Memory</p> <p>The sequence of requests for blocks of size 300, 25, 125, 50 can be satisfied if we use-</p> <ol style="list-style-type: none"> 1. Either first fit or best fit policy (anyone) 2. First fit but not best fit policy 3. Best fit but not first fit policy 4. None of the above <p style="text-align: center;">OR</p>	10	CO3

	Define Page Table, discuss in detail what are the various entries available in a page table.																														
SECTION-C (2Qx20M=40 Marks)																															
Q 10	<p>A disk drive has 200 cylinders, numbered 0 to 199. The drive is currently serving a request at cylinder 53. The queue of pending requests, in FIFO order, is 82, 170, 43, 145, 28, 16, 190. Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk-scheduling algorithms? i) FCFS ii) SSTF iii) SCAN iv) C-SCAN</p> <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> 1. Draw the flow chart for depicting the idea of mapping a logical address to physical address, assume you are using a Translation Lookaside Buffer (TLB) and there are hit and miss while fetching a page and chances of page fault occurrence. Discuss all the involved process in detail. 2. Differentiate between contiguous and noncontiguous memory allocation techniques with examples. 	20	CO3																												
Q11	<p>An operating system uses the banker's algorithm for deadlock avoidance when managing the allocation of three resource types X, Y and Z to three processes P0, P1 and P2. The table given below presents the current system state. Here, the Allocation matrix shows the current number of resources of each type allocated to each process and the Max matrix shows the maximum number of resources of each type required by each process during its execution.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th colspan="3">Allocation</th> <th colspan="3">Max</th> </tr> <tr> <th></th> <th>X</th> <th>Y</th> <th>Z</th> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <th>P0</th> <td>0</td> <td>0</td> <td>1</td> <td>8</td> <td>4</td> <td>3</td> </tr> <tr> <th>P1</th> <td>3</td> <td>2</td> <td>0</td> <td>6</td> <td>2</td> <td>0</td> </tr> </tbody> </table>		Allocation			Max				X	Y	Z	X	Y	Z	P0	0	0	1	8	4	3	P1	3	2	0	6	2	0	20	CO4
	Allocation			Max																											
	X	Y	Z	X	Y	Z																									
P0	0	0	1	8	4	3																									
P1	3	2	0	6	2	0																									

P2	2	1	1	3	3	3
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There are 3 units of type X, 2 units of type Y and 2 units of type Z still available. The system is currently in a safe state. Consider the following independent requests for additional resources in the current state-

REQ1: P0 requests 0 units of X, 0 units of Y and 2 units of Z

REQ2: P1 requests 2 units of X, 0 units of Y and 0 units of Z

Which of the following is TRUE?

1. Only REQ1 can be permitted.
2. Only REQ2 can be permitted.
3. Both REQ1 and REQ2 can be permitted
4. Neither REQ1 nor REQ2 can be permitted