NIRMA UNIVERSITY
Institute of Technology
Additional Test, May 2021
B. Tech. in CSE, Semester – IV
2CS403 – Operating Systems

Time: 75 Minutes | Max Marks: 35

Instructions:
1. Attempt all questions.
2. Figure to right indicate full marks.
3. Assume suitable assumptions and specify them.

Q.1 Consider the following set of processes: **[08]**

Process Name	Arrival Time	Service Time
A	0	5
B	1	3
C	2	2
D	3	6
E	4	4

Draw the Gantt charts that illustrate the execution of the process and find out the average turnaround time and average waiting time for each the following scheduling algorithms.

i. First Come First Serve (FCFS).
ii. Round Robin (T.Q.=2).
iii. Shortest Remaining Time Next (SRTN).
iv. Shortest Job First (SJF).

Q.2 Consider the following system. Apply Banker's Algorithm. **[07]**

Process Name	Allocated				Maximum				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

Answer the following questions.

1. What is the content of matrix Need?
2. Is the system is in safe state?
3. If a request came from P1 of (0, 4, 2, 0), can we immediately grant the request? If yes then still the system is in safe state?

Q.3 Consider the following page trace **[06]**

4, 3, 2, 1, 4, 3, 5 , 4, 3, 2, 1, 5

Calculate the number of page faults that would occur for FIFO, OPTIMAL and LRU page replacement with four page frames. Initially all frames are empty.

Q.4 Given Memory partitions of 100KB, 500KB, 200KB, 300KB, and 600KB size (in that order), how would each of the first fit, best fit and worst fit algorithms places processes of 212KB, 417KB, 112KB and 426KB(in that order)? Which algorithm makes the most efficient use of memory? Justify your answer. **[06]**

Q.5 Suppose that disk drive has 300 cylinders, numbered 0 to 299. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 15. The queue of pending requests, in FIFO order is: 86, 147, 291, 18, 95, 151, 12, 175, and 30. Starting from the current head position, what is the total distance 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. **[06]**

Q.6 Consider the system having a TLB. A time required to search a page from TLB is 20 nanoseconds and 100 nanoseconds to access memory. The hit ratio of TLB is 85-percent. So calculate the effective memory access time. **[02]**