

BCSE – III 1st semester – 2021-22
Operating Systems – Class Test #1

Full marks: 30

Time: 55 minutes

1.

Consider the following page reference during a given time interval for a memory consisting of --- frames : 5,6,7,8,9,5,6,7,1,2,5,6. Using ---- page replacement strategy show the contents of memory and find the hit ratio. 8 [CO3]

Roll nos. ending with the following digits 1,2,3: Use 5 frames and FIFO

Roll nos. ending with the following digits 4,5,6: Use 4 frames and FIFO

Roll nos. ending with the following digits 7,8: Use 5 frames and LRU

Roll nos. ending with the following digits 0,9: Use 4 frames and LRU

2.

Consider a system with four processes as shown below with corresponding arrival time and execution time:

Process	Arrival time	Execution time
P ₀	0	7
P ₁	2	4
P ₂	6	6
P ₃	9	5

Calculate waiting time and turnaround time of each process using Round Robin (RR) scheduling policy with CPU time slice --- units. Show the scheduling decisions using Gantt chart. Mention any assumption that you take.

How will RR behave if the CPU time slice is considerably large? 8 [CO2]

Roll nos. ending with the following digits 1,2,3: Use 4 as CPU time slice

Roll nos. ending with the following digits 4,5,6: Use 3 as CPU time slice

Roll nos. ending with the following digits 7,8: Use 6 as CPU time slice

Roll nos. ending with the following digits 0,9: Use 5 as CPU time slice

3.

a) List of processes waiting on a semaphore are often implemented as queues, and when a signal V() occurs, the first process in the queue is woken up. What would happen if such a waiting list is implemented as a stack instead of a queue? 2 [CO2]

b) Consider the following snapshot of 3 resources (R1, R2, R3) of a system with 5 processes; P₀, P₁, P₂, P₃, P₄. There are 10 instances of R1, 5 instances of R2 and 7 instances of R3.

	<u>Allocated</u>			<u>Maximum Requirement</u>		
	R1	R2	R3	R1	R2	R3
P ₀	0	1	0	7	5	3
P ₁	2	0	0	3	2	2
P ₂	3	0	2	9	0	2
P ₃	2	1	1	2	2	2
P ₄	0	0	2	4	3	3

(i) What are the further requirements of each of the processes?

(ii) Find out whether the system is in *safe* state or not. Show the working of the algorithm/s. What is the safe sequence of processes in this case?

$$[2+(6+2)]=10$$

[CO2]

4. What do you mean by degree of multiprogramming?

2 [CO1]