OS Assignment questions

1. Consider the following page reference string 7,2,3,1,2,5,3,4,6,7,7,1,0,5 for a memory with 3 frames. How many page faults occurs for LRU and FIFO page replacement algorithms? Which is efficient among both? 8

2. Draw the Gantt chart and calculate average waiting time and turn around time for the following snapshot of processes using i) FCFS ii) SRTF iii) RR (2ms). **(07 Marks)**

Process id	Burst time	Arrival time
P_1	6	0
P_2	3	1
P_3	1	2
P_4	4	3

3. Calculate the average waiting time and turn around time for the following snapshol of process using:
   i) Non-preemptive SJF
   ii) Non-preemptive priority
   iii) Round Robin (TQ = 1ms).

P	Burst Time	Priority
P_1	10	3
P_2	1	1
P_3	2	3
P_4	1	4
P_5	5	2

(07 Marks)

4. Using Bankers algorithm determine whether the following system is in a safe state.

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	0	2	0	0	4	1	0	2
P_1	1	0	0	2	0	1			
P_2	1	3	5	1	3	7			
P_3	6	3	2	8	4	2			
P_4	1	4	3	1	5	7			

If a request from process P_2 arrives for (0, 0, 2) can the request be granted immediately? **(07 Marks)**

5. Consider the following page reference string
   7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1
   Assuming there are 3 memory frames, how many page faults would occur in case of i) LRU ii) Optimal algorithm note that initially all frames are empty. **(07 Marks)**

6. Calculate the average waiting time and the average turnaround time by drawing the Gantt chart using FCFS, SRTF, RR (q = 2ms) and priority algorithms. Lower priority number represents higher priority.

Process	Arrival Time	Burst Time	Priority
P_1	0	9	3
P_2	1	4	2
P_3	2	9	1
P_4	3	5	4

(12 Marks)

7. Consider the following snapshot of a system:

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P_0	2	0	0	1	4	2	1	2	3	3	2	1
P_1	3	1	2	1	5	2	5	2				
P_2	2	1	0	3	2	3	1	6				
P_3	1	3	1	2	1	4	2	4				
P_4	1	4	3	2	3	6	6	5				

Answer the following using Banker's algorithm.

i) Is the system in safe state? If so, give the safe sequence.

ii) If process P_2 requests (0, 1, 1, 3) resources can it be granted immediately? (10 Marks)

8. Consider the following snapshot of system:

Process	Allocation			Maximum			Available		
	A	B	C	A	B	C	A	B	C
P0	0	1	0	7	5	3	3	3	2
P1	2	0	0	3	2	2			
P2	3	0	2	9	0	2			
P3	2	1	1	2	2	2			
P4	0	0	2	4	3	3			

Find the need matrix and calculate safe sequence using bankers algorithm-mention the above is safe or not safe. (08 Marks)

9. Consider the following page reference string 1,2,3,4,1,2,5,1,2,3,4,5 for a memory with 3 frames & 4 frames. How many page faults occurs for FIFO page replacement algorithms for memory with two frames and verify FIFO suffers from Belady's Anomaly? 7

10.

Consider the following setof processes, with the length of the CPU burst given in milliseconds:

Process	Arrival Time	Burst Time	Priority
P1	0	6	4
P2	3	5	2
P3	3	3	6
P4	5	5	3

The processes are assumed to be arrived in the order P1, P2, P3, P4, all at time 0.

a. Draw four Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: SJF pre-emptive, RR (quantum = 1).

b. Compute the turnaround time of each process for each of the scheduling algorithms in part a?

c. Compute the waiting time of each process for each of the scheduling algorithms in part a?

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