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IT 307: Numerical Question OF Operating System

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Unit 3

Operating System Scheduling Question

Shortest Job First (SJF):

For all the question, solve with both non-preemption and preemption scheduling strategy. Also calculate turnaround time, waiting time, response time and average time for all.

Question no. 1

Process	Arrival Time	Burst Time
1	1	7
2	2	5
3	3	1
4	4	2
5	5	8

Question no. 2

Process	Arrival Time	Burst Time
1	1	6
2	2	4
3	3	3
4	4	5
5	5	4

Question no. 3

Process	Arrival Time	Burst Time
1	0	7
2	1	5
3	2	3
4	3	1
5	4	2
6	5	1

Question no. 4

Process	Arrival Time	Burst Time
1	0	3
2	1	5
3	2	2
4	3	5
5	4	5

Question no. 5

Process	Arrival Time	Burst Time
P1	0	7
P2	2	4
P3	4	1
P4	5	4

Priority Scheduling:

For all the question, solve with both non-preemption and preemption scheduling strategy. Also calculate turnaround time, waiting time, response time and average time for all.

Question no. 1

Process	Priority	Arrival Time	Burst Time
P1	2 (Low)	0	4
P2	4	1	2
P3	6	2	3
P4	10	3	5
P5	8	4	1
P6	12 (High)	5	4
P7	9	6	6

Question no. 2

Process	Priority	Arrival Time	Burst Time
P1	3	0	8
P2	1	1	1
P3	2	2	3
P4	3	3	2
P5	4	4	6

Question no. 3

Process	Priority	Arrival Time	Burst Time
P1	5	1	4
P2	2	2	5
P3	6	3	6
P4	4	0	1
P5	7	4	2
P6	8	5	3

Question no. 4

Process	Priority	Arrival Time	Burst Time
P1	2	0	10
P2	1	2	5
P3	0	3	2
P4	3	5	20

Question no. 5

Process	Priority	Arrival Time	Burst Time
P1	40	20	0
P2	30	25	25
P3	30	25	30
P4	35	15	60
P5	5	10	100
P6	10	10	105

Question no. 6

Process	Priority	Burst Time
P1	2	2
P2	1	1
P3	4	8
P4	2	4
P5	3	5

Round Robin Scheduling

Calculate turnaround time, waiting time, response time and average time for all.

Question no. 1

Process	Burst
P1	24
P2	3
P3	3

Take time quantum 4 millisecond

Question no. 2

Process	Arrival Time	Burst Time
P1	5	5
P2	4	6
P3	3	7
P4	1	9
P5	2	2
P6	6	3

Take time quantum 3 millisecond and 4 millisecond

Question no. 3

Process	Arrival Time	Burst Time
P1	0	4
P2	1	5
P3	2	2
P4	3	1
P5	4	6
P6	6	3

Take time quantum 2 millisecond

Question no. 4

Explain any three types of preemptive scheduling algorithm with example. [Board 2018]

Rate Monotonic Scheduling:

Question no. 1:

Process	Burst	Period
P1	3	20
P2	2	5
P3	2	10

Question no. 2

Process	Burst	Period
P1	20	50
P2	35	100

Question no. 3

Process	Burst	Period
P1	25	50
P2	35	80

Question no. 4

Process	Capacity	Period
P1	2	10
P2	1	5
P3	5	30
P4	2	15

Earliest Deadline First:

Question no. 1:

Process	Burst	Deadline	Period
P1	3	7	20
P2	2	4	5
P3	2	9	10

Question no. 2

Process	Burst	Deadline	Period
P1	2	4	4
P2	3	6	6

Question no. 3

Process	Burst	Deadline	Period
P1	2	7	20
P2	2	4	5
P3	2	8	10

Question:

Consider a system which has CPU process which requires 50 times unit to complete the work. The time quantum is 3 unit and incremented by 4 unit in each level. How many times the process is interrupted and in which queue the process will completed their execution.

Question:

Process	Arrival Time	Burst Time
P1	0	13
P2	1	6
P3	4	4
P4	6	20

Calculate the average waiting time for each of the processes for preemptive and non-preemptive SJF and Round robin scheduling algorithm with quantum size 4.

Unit 4

Numerical Question of Bankers Algorithm

Question no.1

Process	Allocation			Max			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	4	2	2			
P4	0	0	2	5	3	3			

- Find the need matrix?
- Is the system is in safe state? If yes find the safe sequence?

Question no.2

Process	Allocation			Max			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	5	3	3			

- Find the need matrix?
- Is the system is in safe state? If yes find the safe sequence?
- If P1 request (1, 0, 2). Can the request be granted immediately?

Question no. 3

Process	Allocation				Max				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				

- Find the need matrix?
- Is the system is in safe state? If yes find the safe sequence?
- If P1 request (0, 4, 2, 0). Can the request be granted immediately?

Question no. 4

Process	Allocation			Max			Available		
	A	**B**	**C**	**A**	**B**	**C**	**A**	**B**	**C**
P0	1	0	1	4	3	1	3	3	0
P1	1	1	2	2	1	4			
P2	1	0	3	1	3	3			
P3	2	0	0	5	4	1			

- Find the need matrix?
- Is the system is in safe state? If yes find the safe sequence?

Question no. 5

Process	Allocation			Max			Available		
	A	**B**	**C**	**A**	**B**	**C**	**A**	**B**	**C**
P0	1	0	1	2	1	2	2	1	2
P1	0	0	1	3	2	4			
P2	1	1	1	4	2	1			

- Find the need matrix?
- Is the system is in safe state? If yes find the safe sequence?
- If P2 request (1, 0, 1). Can the request be granted immediately?
- If P3 request (1, 0, 0). Can the request be granted immediately?

Question no. 6

Consider a system with four process having following need and allocation matrix of resources. Use banker algorithm to find safe state that have total of (6, 11) unit resource.

Process	Allocation		Max		Need Remain	
	R1	R2	R1	R2	R1	R2
P1	2	4			0	5
P2	0	2			1	2
P3	2	3			0	4
P4	1	0			2	5

Unit 5

Numerical Question

Best fit, first fit and worst fit Questions:

1. Given the five memory partition of 100KB, 500KB, 200KB, 300KB and 600KB in order. How would first fit, best fit and worst fit algorithm place process of 212 KB, 417KB, 112KB, and 426KB in order **using variable partitioning and fixed partitioning**. Which algorithm makes the efficient use of memory?
2. Given the memory partition of 150KB, 550KB, 250KB, 350KB, and 650KB in order. How would each of the first fit, best fit and worst fit algorithm place processes 220KB, 420KB, 120KB, 430KB (in order) **using variable partitioning and fixed partitioning**. Which algorithm will make worst use of memory?
3. Given the memory partition of 50 KB, 150 KB, 300 KB, 350 KB and 600 KB in order. But condition is that the block of 50 KB, 300KB and 600KB memory are already used or busy. How would first fit, best fit and worst fit algorithm place process of 300 KB, 25 KB, 125 KB and 50 KB in order **using variable partitioning and fixed partitioning.**
4. Given the memory partition of 200, 400, 600, 500, 300, 250KB in order. How would each of the first fit, best fit and worst fit algorithm place processes 357, 210, 468 and 491KB in order **using variable partitioning and fixed partitioning.** Which algorithm makes the efficient use of memory?
5. Given the memory partition of 150KB and 350KB in order. How would each of the first fit, best fit and worst fit algorithm place processes 300KB, 25KB, 125KB, 50KB in order **using variable partitioning and fixed partitioning.** Which algorithm makes the efficient use of memory?
6. Consider the following information and calculate the time at which process 7 will be completed using best fit strategy but fixed partitioning?

Process	P1	P2	P3	P4	P5	P6	P7	P8
Request size	2 KB	14 KB	3 KB	6 KB	6 KB	10 KB	7 KB	20 KB
Usage time	4 KB	10 KB	2 KB	8 KB	4 KB	1 KB	8 KB	6 KB
Memory block	4 KB	8 KB	20 KB	2 KB				

Page Replacement Numerical Question:

1. How many page fault occurs for the following page reference string with four and three page frame?
   1, 2, 3, 4, 5, 3, 4, 1, 6, 7, 8, 7, 8, 9, 7 8, 9, 5, 4, 5, 4, 2.
   If we use:
   i. FIFO page replacement
   ii. LRU page replacement
   iii. Optimal page replacement
2. How many page fault occurs for the following page reference string with four, three and two page frame?
   7, 0, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1.
   If we use:
   i. FIFO page replacement
   ii. LRU page replacement
   iii. Optimal page replacement
3. How many page fault occurs for the following page reference string with four and three page frame?
   1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5.
   If we use:
   i. FIFO page replacement
   ii. LRU page replacement
   iii. Optimal page replacement
4. How many page fault occurs for the following page reference string with two and three page frame?
   2, 3, 2, 1, 5, 2, 4, 5, 3, 2, 5, 2.
   If we use:
   i. FIFO page replacement
   ii. LRU page replacement
   iii. Optimal page replacement
5. How many page fault occurs for the following page reference string with three and four page frame?
   1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6
   If we use:
   i. FIFO page replacement
   ii. LRU page replacement
   iii. Optimal page replacement

Unit 6

Disk Scheduling Numerical Questions

1. Disk request comes into the disk queue for the cylinders 10, 22, 20, 2, 40, 6 and 38 in order. A seek takes 6 millisecond per cylinder moved. How much seek time is needed for
   a) FCFS
   b) Shortest seek time first
   c) SCAN and C-SCAN
   d) LOOK and C-LOOK

   In all case disk arm is initially at cylinder 20 and direction takes the larger value.

2. Disk request comes into the disk queue for the cylinders 98, 183, 37, 122, 14, 124, 65, 67. Head starts at 53 and previously was on 40. Calculate the total distance covered by the disk head to serve each cylinder.
   a) FCFS
   b) Shortest seek time first (SSTF)
   c) SCAN and C-SCAN
   d) LOOK and C-LOOK
3. Suppose a disk have 500 cylinder no. from 0 to 499. It has the queue in which process arrived in FIFO order for cylinder requests as 420, 220, 360, 20, 89, 150, 110, 320, 15 and 400. Currently disk head is servicing at cylinder 100 and previously it was servicing at cylinder 105. Calculate the total distance covered by the disk head to service each cylinder request using:
   a) FCFS
   b) SSTF
   c) SCAN and C-SCAN
   d) LOOK and C-LOOK
4. Queue: 86, 1470, 913, 1774, 998, 1500, 1023, 1750, 130
   Total cylinder: 5000
   Header: 143
   Previous header: 125
   Calculate the total distance covered by the disk head to service each cylinder request using:
   a) FCFS
   b) SSTF

c) SCAN and C-SCAN
d) LOOK and C-LOOK

5. Suppose that a disk has 100 cylinder from 0 to 99 where the current head position is 39 and previous head position is 50. If the disk access request is 82, 66, 69, 70, 44, 3, 18, 46, and 26. What is the total distance that the disk arm moves to satisfy all the pending request for each of the following disk scheduling algorithm?
   a) SSTF
   b) SCAN
6. Suppose that a disk has 200 cylinder from 0 to 199 where the current head position is 50 and direction takes the larger value. If the disk access request is 82, 170, 43, 140, 24, 16 and 190. What is the total distance that the disk arm moves to satisfy all the pending request for each of the following disk scheduling algorithm?
   a) SSTF
   b) SCAN & C-SCAN
   c) FCFS
   d) LOOK & C-LOOK