

Roll No.

Total Pages : 4

312303

December 2022

BCA (DS) - III SEMESTER

Principles of Operating System (BCA-DS-203)

Time : 3 Hours]

[Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

1. (a) What is kernel? (1.5)
- (b) What are overlays? (1.5)
- (c) Differentiate between preemptive and non-preemptive scheduling. (1.5)
- (d) Differentiate between contiguous and non-contiguous memory allocation methods. (1.5)
- (e) What is thrashing? (1.5)
- (f) Write differences between process and thread. (1.5)
- (g) What is convoy effect? (1.5)

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- (h) What is rotational latency? (1.5)
 (i) What is the need of operating system? (1.5)
 (j) Differentiate between logical and physical address space. (1.5)

PART-B

2. (a) Explain different types of operating system with suitable applications. (10)
 (b) What is a process scheduler? State the characteristics of a good process scheduler and also explain the types of schedulers. (5)

3. (a) Write and explain deadlock characteristics. (5)
 (b) Consider the following set of processes, with the length of the CPU-burst time given in Milliseconds (ms) :

Process	Arrival Time	Burst Time
P1	0	7
P2	2	4
P3	3	2
P4	9	1

Draw the Gantt chart for RR scheduling (time-slice = 2 ms) and Pre-emptive SJF scheduling and also find the average waiting time for both scheduling algorithms. (10)

4. What are the different methods of handling deadlock? Consider the following questions based on the banker's algorithm :

	Allocation	Max	Available
P0	A B C D	A B C D	A B C D
P1	0 0 1 2	0 0 1 2	1 5 2 0
P2	1 0 0 0	1 7 5 0	
P3	1 3 5 4	2 3 5 6	
P4	0 6 3 2	0 6 5 2	
P5	0 0 1 4	0 6 5 6	

- (a) What is the content of the matrix Need? (15)
 (b) Is the system in a safe state? If yes, Find the safe sequence. (15)

5. (a) Consider a system with byte-addressable memory, 32-bit logical addresses, 4 kilobyte page size and page table entries of 4 bytes each. What is the size of the page table in the system in megabytes? (5)
 (b) Explain Demand paging using a diagram. Consider page reference string 1, 3, 0, 3, 5, 6 with 3-page frames. Find number of page faults for FIFO and Least recently used algorithms. Also find which is best algorithm. (10)

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 1 2 1 3 2 1 4 1

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1 2 1 3 2 1 4 1
 1 2 1 3 2 1 4 1

1 2 1 3 2 1 4 1
 1 2 1 3 2 1 4 1

6. (a) Explain all file allocation methods in detail with their advantage and disadvantages. (10)
- (b) A disk queue with requests for I/O to blocks on cylinders 23, 89, 132, 42, 187 with disk head initially at 100. Calculate total head movement for SSTF and C-LOOK algorithms. (5)
7. Write short note on following :
- (a) Disk Structure.
- (b) Segmentation.
- (c) Operating System services. (15)
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