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Total No. of Pages : 03

Total No. of Questions : 09

B.Tech.(CSE/IT) (2011 Onwards) (Sem.-4)

OPERATING SYSTEMS

Subject Code : BTCS-401

Paper ID : [A1183]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A**1. Write briefly :**

- a. What is the difference between dynamic and static linking?
- b. What are the differences between load-time and run-time dynamic linking?
- c. What is software trap and how is it used in operating system design?
- d. What is difference between preemptive and non-preemptive scheduling?
- e. Describe terms long-term, medium-term and short-term thread scheduling.
- f. Describe the terms : internal and external fragmentation.
- g. What are consequences of choosing large page sizes, and what of small page sizes?
- h. Why the page size has to be a power of two?
- i. What is page replacement? List all page replacement policies you know.
- j. What is disk formatting and what basic information is stored with each disk sector.

SECTION- B

2. Five jobs are in the ready queue waiting to be processed. Their estimated CPU cycles are as follows : 10,3,5,6 and 2. Using SJF, in what order they should be processed to minimize average waiting time? (5)

3. a) Provide the solution for Reader/Writer problem using semaphores with no busy waiting. (3)
- b) Describe bit map approach in free space management : Use block diagrams. List advantages and disadvantages. (2)
4. a) What is disk scheduling?
- b) When is it used?
- c) Why is it used?
- d) Who is performing the disk scheduling?
- e) What disk scheduling algorithms do you know? (5)
5. Given the following information :

Job Number	Arrival time	CPU Cycle	Priority
1	0	75	3
2	10	40	1
3	10	25	4
4	80	20	5
5	85	45	2

Draw a timeline for each of the following scheduling algorithms and determine which one gives the best results.

- 1) FCFS
- 2) SJF
- 3) Round Robin (using a time quantum of 15)
- 4) Priority scheduling.

Assume a small integer means higher priority.

- (5)
6. a) What causes a process/thread to change the state?
- i. From running to ready?
 - ii. From ready to running?
 - iii. From running to blocked?
 - iv. From blocked to ready? (3)
- b) Describe dynamic partitioning. What is the main problem in dynamic partitioning? How is it solved? (2)

SECTION-C

- 7 Consider a system consisting of m resources of the same type, being shared by n processes. Resources can be requested and released by processes only one at a time. Show that the system is deadlock-free if the following two conditions hold :

- a) The maximum need of each process is between 1 and m resources
- b) The sum of all maximum needs is less than $m + n$ (10)

- 8 a) Consider the following snapshot of a system :

	Allocation	Max	Available
	ABCD	ABCD	ABCD
P0	0 0 1 2	0 0 1 2	1520
P1	1000	1750	
P2	1354	2356	
P3	0632	0652	
P4	0014	0656	

Answer the following question using the banker's algorithm :

- a) What is the content of the matrix *Need*? (5)
 - b) Why are segmentation and paging sometimes combined into one scheme? (5)
- 9 a) Discuss Peterson's solution for critical section problem. What are the limitations of this solution and how it can be resolved? (5)
- b) Consider the following segment table :

Segment	Base	Length
0	219	600
1	230	014
2	90	100
3	1327	580
4	1952	96

What are the physical addresses for the following logical addresses? Explain :

- a. 0,430
- b. 1,10
- c. 2,500
- d. 3,400
- e. 4,112 (5)