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4TH SEMESTER

Roll No.....
B.Tech.(CO)
(May 2018)

SE/

CO 213 (Old Scheme): Operating System Design

Time: 3:00 Hours

Max. Marks: 70

Note: Answer any five questions.
Assume suitable missing data, if any.

- Q 1. (a) Explain fork system call. [4]
(b) Describe Peterson's solution. [3]
(c) What is meant by inter process communication? Explain the two fundamental models of inter process communication. [7]
- Q 2. (a) What is a race condition? Explain how a critical section avoids this condition. What are the properties which a data item should possess to implement a critical section? [7]
(b) Describe a solution to the Dining philosopher problem so that no races arise. [7]
- Q 3. (a) Consider the situation in which the disk read/write head is currently located at track 45 (of tracks 0-255) and moving in the positive direction. Assume that the following track requests have been made in this order: 40, 67, 11, 240, 87. What is the order in which optimized C-LOOK would service these requests and what is the total head movement? Also, calculate the total head movement in case of shortest seek time first. [9]
(b) What is directory? What are the different ways to implement a directory? [5]
- Q 4. (a) Consider the following system snapshot using data structures in the Banker's algorithm, with resources A, B, C, and D, and process P0 to P4:

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

Using Banker's algorithm, answer the following questions.

- (i) How many resources of type A, B, C, and D are there?
(ii) What are the contents of the Need matrix?
(iii) Is the system in a safe state? Why
(iv) If a request from process P4 arrives for additional resources of (1,2,0,0), can the Banker's algorithm grant the request immediately? Show the new system state and other criteria. [10]
(b) Explain the process states by using processes state transition diagram. [4]

Q.5 (a) Consider the following table of arrival time and burst time for three processes P0, P1 and P2.

Process	Arrival time	Burst Time
P0	0 ms	9 ms
P1	1 ms	4 ms
P2	2 ms	9 ms

The pre-emptive shortest job first scheduling algorithm is used. Scheduling is carried out only at arrival or completion of processes. What is the average waiting time for the three processes? [7]

(b) What is the difference between Parallel and Distributed Systems? Explain. [4]

(c) Explain seek time and rotational latency. [3]

Q 6. (a) Consider the following page reference string: 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. How many page faults would occur for the following replacement algorithms, assuming frame size of four.

- LRU replacement
 - FIFO replacement
 - Optimal replacement
- [7]

(b) Under what circumstances do page faults occur? Describe the actions taken by the operating system when a page fault occurs. [4]

(c) What criteria should be adopted for choosing the type of file organization. [3]

Q 7. Write short notes on the following (any four): [3.5*4=14]

- (a) Round Robin and Shortest Job first Process Scheduling Algorithm
- (b) Internal and external fragmentation.
- (c) Paging and segmentation
- (d) Disk structure
- (e) Kernel

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