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CS-13

00457

ADCA / MCA (III YEAR)

Term-End Examination

December, 2010

CS-13 : OPERATING SYSTEMS

Time : 3 hours *Maximum Marks : 75*

Note : *Question number 1 is **compulsory**. Answer **any three** questions from the rest.*

1. (a) Given a set of cooperating process, some of which produce" data items (producers) to be " consumed " by others (consumers), with possible disparity between production and consumption rates. Devise a Synchronization protocol that allows both producers and consumers to operate concurrently at their respective service rates in such a way that produced items are consumed in that exact order in which they are produced (FIFO) 8

(b) Explain the functional specification for partition allocation of memory in a system with static partitioning. List the advantages and disadvantages of it. Also describe the necessary hardware support for protection. 7

(c) Consider the following set of processes, with the length of the CPU burst time given in milliseconds: 9

Process	Burst time
P_1	12
P_2	26
P_3	5
P_4	7
P_5	14

All five processes arrive at time 0 in the order given. Draw Gantt charts illustrating the execution of the processes using FCFS, SJF and RR (quantum = 2) scheduling. What is the turnaround time of each process for each of the scheduling algorithms? Also find the average waiting time for each algorithm.

(d) Discuss any three common failures and their reasons in the distributed system. 6

2. (a) What is a scheduler ? Explain the primary objective of scheduling. How many types of schedules coexist in a complex operating system ? Explain. 8

(b) Explain the memory management scheme that removes the requirement of contiguous allocation of physical memory. 7

3. (a) Discuss various types of multiprocessor interconnections. Also discuss about their operation, scalability, scheduling, interprocess communication and complexity. 8

(b) Discuss the organization of File Allocation Table (FAT) with a suitable example. What kind of Fragmentation occurs in FAT. 7

4. (a) Describe the necessary conditions for a deadlock avoidance using Banker's algorithm. Also discuss data structures for implementing this algorithm. 9

(b) Consider the following string of pages 1,2,2,0,5,1,7,3,4,1,4,3,6,7,0 find the no. of page faults for the following Page Replacement Algorithm. Consider frame size is, 3. FIFO, LRU, OPTIMAL. 6

5. (a) Describe Belady's anomaly with an example. Does it occur with all page replacement algorithms? 8

(b) Explain the access matrix model of protection of computer systems. 7