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FOURTH SEMESTER

B. Tech [CO]

END SEMESTER EXAMINATION

MAY-2019

# CO 204: Operating Systems Design

Time: 3:00 Hours

Max. Marks: 40

Note :1)Attempt any five questions.
2)All parts of a question must be attempted together.

Q.1. a)The functions and services provided by an operating system can be divided into two main categories. Briefly describe the two categories and discuss how they differ. [4]

b) Explain the differences in how much FCFS, Round Roubin and Multiple feedback queues scheduling algorithms discriminate in favour of short processes? [4]

Q2. a)Differentiate between preemptive and non-preemptive scheduling. [4]

b) What is the cause of thrashing? How does the system detect thrasing and eliminates it? [4]

Q3. a) Consider a system consisting of m resources of the same type being shared by n processes. A process can request or release only one resource at a time. Show that the system is deadlock free if the following two conditions hold :

I. The maximum need of each process is between one resource and m resources.

II. The sum of all maximum needs is m+n. [4]

b) What is the optimistic assumption made in the deadlock-detection algorithm? How can this assumption be voilated? [4]

Q4. Attempt any <u>two</u> .

a) Define Race condition. How does signal() operation associated with monitors differ from the corresponding operation defined for semaphores? [4]

b)Describe how the compare_and_swap() instruction can be used to provide mutual exclusion that satisfies the bounded-waiting requirement. [4]

c) Consider a computer system with 32-bit logical address and 4KB page size. The system supports up to 512MB of physical memory. How many entries will be there in a conventional single-level page table and in an inverted page table? [4]

P.T.O

Q5. What is the purpose of paging the page tables? Consider the Page replacement string as :7,2,3,1,2,5,3,4,6,7,7,1,0,5,4,6,2,3,0,1
Assuming demand paging with three frames, how many page faults would occur for the following replacement algorithms?

I. LRU replacement
II. FIFO replacement
III. Optimal Replacement [8]

Q6. a)Compare the throuhput achieved by a RAID level 5 organization with that achieved by a RAID level 1 organization for the following :

I. Read operation on Single block
II. Read operation on multiple continuous blocks. [4]

b)Explain why logging metadata updates ensures recovery of a file system after a file-system crash? [4]

Q7. Consider a disk drive having 5000 cylinders, numbered 0 to 4999. The drive is currently serving the request at 2150, and the previous request was at 1805. The queue of pending requests in FIFO order is 2069, 1212, 2296, 2800, 544, 1618, 356, 1523, 4965, 3681. Starting from the current head position , what is the total distance(in cylinders) that the disk arms moves to satisfy all the pending requests, if the following disk scheduling algorithm is being used : [8]

I. FCFS
II. SCAN
III. C-LOOK
IV. SSTF

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