(Please write your Exam Roll No.) Exam Roll No. 4.0.5.5.0.4.0.4.4.1.7

END TERM EXAMINATION

SECOND SEMESTER [MCA] MAY-JUNE 2018

Paper Code: MCA-106 **Subject: Operating System**

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt any five questions including Q no.1which is compulsory.

Q1 (a) Write three differences between a process and a thread. What do you mean by user level and kernel level threads? Write any three differences among them. **(5)**

(b) Design a solution to a critical section problem suing one semaphore and check it for mutual exclusion, progress and bounded waiting conditions. **(5)**

(c) What do you mean by an inverted page table? **(5)**

(d) Explain various file access methods. **(5)**

(e) Explain how does a page size affect the performance of demand paging? **(5)**

Q2 (a) What do you mean by a process control block? Explain process state transition diagram with suitable transitions. **(6)**

(b) Given the following set of processes along with their data. Compute average waiting time for each process for preemptive SJF and Round Robin scheduling algorithms. **(6.5)**

Processes	CPU bursts	Arrival time in ready queue
P1	8	0
P2	5	1
P2	2	2
P3	4	2

Assume context switching overhead is 1 time unit and time quantum used in round robin scheduling is 2 time units.

Q3 (a) Explain with suitable example that rate monotonic and deadline monotonic algorithm of real time scheduling are identical if the periods of real time process are same to their corresponding relative deadlines. **(6)**

(b) Write a solution to readers/writers problem using semaphore and justify its working. **(6.5)**

Q4 (a) What do you mean by a circular wait condition in deadlock? Design a protocol which violates this condition and justify its worthliness. **(6)**

(b) Write an algorithm for deadlock detection for multiple instances of resources. **(6.5)**

Q5 Explain memory address binding method using paging. How the concept of associative memory is useful in the context? If main memory access time is 50 msec and associative memory access time is 20 nsec what will be the hit ratio if the maximum achievable improvement in main memory access time is 40%? **(12.5)**

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P1/2

Q6 (a) Given the following set of page reference string, compute number of page faults for Optical, LRU and second chance LRU page replacement algorithms. Assume that four frames have been allocated to the process. **(6.5)**

23, 12, 5, 25, 12, 11, 10, 10, 23, 12, 10, 11, 12, 6, 19

(b) Explain with suitable example that a program structure affects the performance of demand paging in virtual memory. **(6)**

Q7 (a) Explain SSTF and SCAN disk scheduling algorithms with suitable example. What are different parameters on which the performance of dick scheduling algorithm algorithms does depend? **(6.5)**

(b) What do you mean by data stripping? How is RAID concept useful in disk reliability? **(6)**

Q8 What do you mean by various file allocation methods? Explain advantages and disadvantages of each method. **(12.5)**

Q9 Write short note on the following:-

(a) File Access Methods **(3)**

(b) Inode in UNIX operating system **(3)**

(c) Thrashing **(3.5)**

(d) Time sharing system **(3)**

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