

END TERM EXAMINATION

THIRD SEMESTER [MCA] DECEMBER 2010

Paper Code: MCA201

Subject: Operating System

Paper ID:44201

Time: 3 Hours

Maximum Marks: 60

Note: Attempt five questions. Select one question from each unit including Q.1 which is compulsory

Q1 Answer all the following question briefly: -

(2x 10=20)

- (a) What is the convoy effect? Briefly explain.
- (b) What is the main difficulty that a programmer must overcome in writing an operating system for a real-time environment?
- (c) What data structures can be used for directory information?
- (d) "Higher degree of multiprogramming badly affects the performance of the computing system"- comment.
- (e) What is FAT? How is FAT beneficial?
- (f) Differentiate between Constant Linear Velocity and Constant Angular Velocity of disk structure.
- (g) Consider a file system where a file can be deleted and its disk space reclaimed while links to that file still exist. What problems may occur if a new file is created in the same storage area or with the same absolute path name? How can these problems be avoided?
- (h) Differentiate between Logical and Physical file system.
- (i) Suppose a process P wants to wait for two messages, one from mailbox A and one from Mailbox B. What sequence of send and receive should it execute?
- (j) What is SPOOLING? Briefly explain.

UNIT-I

Q2

- (a) Describe a mechanism by which one segment could belong to the address space of two different processes. (5)
- (b) How many page fault occur for Optimal and LRU algorithms for the following reference string, for four page frames and which algorithm is the best(show computations)? (5)
1,2,3,4,5,3,1,6,7,8,7,8,9,7,8,9,5,4,5,4,2

Q3

- (a) Given the memory partition of 600K , 200K, 250K,500K (in order) how would each of the **first-fit, best-fit and worst-fit** algorithms place processes of 128k, 581k, 411k, 221k (in order)? Which algorithm makes the efficient use of memory? (5)
- (b) What are the different ways to implement Least Recent Used algorithm, to determine which page is decided as a victim page? (5)

UNIT-II

Q4 Consider the processes listed in the following table:-

| Processes | Arrival Time | Burst Time | Priority No. |
|-----------|--------------|------------|--------------|
| P1 | 1 | 20 | 2 |
| P2 | 4 | 16 | 1 |
| P3 | 5 | 04 | 3 |

Answer the following:-

- (a) Draw 3 Gantt charts for Priority (pre-emptive), SJF (non pre-emptive) and RR (with the quantum 4).
- (b) Calculate avg. waiting time for each of the above scheduling.
- (c) Calculate avg. Turnaround time for each of the above scheduling. Note that the small integer value (of priority No.) indicates high order of priority.

Q5

- (a) Explain Readers-writers problem with its algorithm. (6)
- (b) How are synchronization tools helpful? Explain critical region and monitors. (4)

UNIT-III

Q6

- (a) What are the safety algorithm and Resource Request algorithm? Explain them with example. (5)
- (b) Explain secondary storage structure having small variance in access time $T(i, j)$. (5)

Q7

- (a) Suppose that a disk drive has 2000 cylinders numbered 0 to 1999. The drive is currently at 10 and previous record was at 140. The queue of pending requests, in FIFO is 68, 1460, 811, 200, 1500, 1022, 28, 1389, 887, 160. Starting from current head position, what is the total distance that disk moves to satisfy all pending request for each algorithms:-
(i) SSTF (ii) C-SCAN (iii) LOOK (6)
- (b) What are the differences between techniques of Buffering from that of Blocking? Explain with example. (4)

UNIT-IV

Q8

- (a) How do caches help to improve performance of the systems? Why do no systems use more or larger caches, if they are so useful? Explain with example. (5)
- (b) Explain Indexed and Contiguous file allocation methods with suitable example. (5)

Q9 Write short notes on **any two** of the following:-

(5x2=10)

- (a) Real-Time vs. Embedded Systems
- (b) Multi-Level Feedback Queues
- (c) Deadlock Prevention vs. Deadlock Avoidance
