Code: 9F00204

MCA II Semester Regular & Supplementary Examinations, October/November 2013

OPERATING SYSTEMS

Time: 3 hours   Max Marks: 60

Answer any FIVE questions
All questions carry equal marks
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1 (a)   Define the essential properties of the following types of operating systems:
(i) Real time.
(ii) Distributed.
(iii) Time-shared.

(b)   What are system calls? Explain with an example how system calls are used. Explain the methods used to pass parameters to the operating system.

2 (a)   What are the different states a process can be in? Explain process state diagram in detail.

(b)   Compare and contrast preemptive and nonpreemptive scheduling algorithms. Give examples for each.

3 (a)   Discuss in detail Peterson's solution to the critical section problem.

(b)   What is a monitor? Give the schematic view of a monitor with conditional variables and explain.

4 (a)   Differentiate between logical and physical addresses.

(b)   How many page faults occur for the following reference string, with four page frames:
1, 2, 3, 4, 5, 3, 4, 1, 6, 7, 8, 7, 8, 9, 7, 8, 9, 5, 4, 5, 4, 2?
(i) For FIFO page replacement algorithm.
(ii) For LRU page replacement algorithm.

5 (a)   What are the problems of contiguous allocation? How does linked allocation technique solve them? What are its advantages?

(b)   Explain in detail about file system mounting.

6   Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143 and the previous request was at cylinder 125. The queue of pending requests in FIFO order is:

86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130.

Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk scheduling algorithms?

(a) FCFS.
(b) SSTF.
(c) SCAN.
(d) LOOK.

7 (a) Define the deadlock problem. Write deadlock characterization or conditions for deadlock.
   (b) Explain Banker's algorithm for deadlock avoidance with an example.

8 (a) Explain the following principles of protection:
        (i) Need-to-know principle.
        (ii) Principle of least privilege.
   (b) What is authentication? Explain in detail various message authentication algorithms.

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