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# MANIPAL INSTITUTE OF TECHNOLOGY
(Constituent Institute of MANIPAL University)
MANIPAL-576104

V SEMESTER B.E. (CSE 307)
SUBJECT**: OPERATING SYSTEM AND UNIX**

Date: **29-11-2008** TIME : 3 HOUR MAX.MARKS :50

**Instructions to Candidates**

- Answer **ANY 5** of the following.
- Write the question number clearly.
- Answer in sequential order of the question number

1a ) With necessary diagram briefly explain the dual mode operation i)It's necessity and ii) Explain when the mode change occurs 4 marks

1b) What is the
i) advantage
ii) difficulty with respect to layered approach in the case of operating system structure. 4 marks

1c) Explain briefly the shared memory system model in interprocess communication with relevant diagram 2 marks

2a) Write the similarity and difference between clone() and fork() system call 2 marks

2b) Suppose that the following processes arrive for execution at the times( in msecs) indicated.

| Process | Arrival Time | Burst Time |
|---|---|---|
| *P*1 | 0 | 6 |
| *P*2 | 2 | 4 |
| *P*3 | 4 | 1 |

What is the turnaround time and waiting time for each of the process in the case of SJF preemptive scheduling algorithm? Draw Gantt chart and show steps 3 marks

2c) Explain the solution to the first readers-writer problem. Specify the various initializations and what is the problem faced 5 marks

3a)What the four necessary conditions for deadlock to occur? Explain the methods for handling deadlock 4 marks

3b)On a simple paging system with a page table containing 64 entries of 10 bits each, and page size 512 bytes

i) What is the size of the physical address space?
ii) What is the size of logical address space?
iii) What is the offset within the page frame? 3 marks

3c) Explain how the three operations allow control change in the contents of the access matrix 3 marks

4a)How many page faults occur in the case of Optimal algorithm for the reference string, with four page frames? Show all steps
1,2,3,4,5,3,4,1,6,7,8,7,8,9,7,8,9,5,4,5,4,2 4 marks

4b)Explain the problems that exists in the case of acyclic graph directories and how can it be solved? 3 marks

4c)Suppose that a disk drive has 5,000 cylinders, numbered 0 to 4999. The drive currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue for the pending request, in FIFO order is : 86,1470,913,1774,948, 1509, 1022, 1750, 130.
Starting from the current head position, what is the total distance that the disk arm moves to satisfy all the pending requests in the case of C-LOOK disk scheduling. Show all the steps 3 marks

5a)Explain the stack and buffer overflow method of attacking the system with an example 4 marks

5b)Explain how process scheduling takes place in the case of linux system 3 marks

5c)Explain hashed page tables with diagram. Is the hash table size larger or smaller than inverted page table 3 marks

6a) What is the cause of thrashing? How does the system detect thrashing? Once it detects thrashing, what can the system do to eliminate this problem? 3 marks

6b) Show that if the wait() and signal() semaphore operations are not executed atomically, then mutual exclusion may be violated 2 marks

6c) What is the difference between physical and logical address space 2marks

6d) Write an algorithm which determines if a request for resource allocation can be safely granted 3 marks