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

V SEMESTER B.E. (CSE)
END SEMESTER EXAMINATION -December 2010
SUBJECT: OPERATING SYSTEMS AND UNIX (CSE 307)

TIME: 3 HOUR

MAX.MARKS: 50

Instruction to Candidates

- Answer any 5 full questions.

1 a) Explain the logical to physical address translation in Intel Pentium with the help of neat labeled diagrams. (2+1)

b) Write Peterson's solution to critical section problem. Prove this solution satisfy the requirements of Mutual Exclusion of a critical section problem. (3)

c) List the different ways in which the access control matrix can be implemented. (2)

d) Explain the terms of external and internal fragmentation. (2)

2 a) Given the memory partitions of 100k, 500k, 200k, 300k and 600k (in order). How would the worst fit and best fit algorithms place processes of 212k, 417k, 112k and 426k (in order)? (1+1)

b) Explain the semantics of exec() and fork() system calls in Threads. (3)

P.T.O.

c) Explain Slab Allocation of Kernel Memory with the help of a neat labeled diagram. (3)

d) Explain sector sparing with an example. (2)

3 a) If the total number of available frames is 50, and there are 2 processes one of 10 pages and the other of 5 pages then how much of memory would be proportionally allocated to each of these processes?. (2)

b) Explain the following terms. (3)

- i) Medium Term Scheduler.
- ii) Job Scheduling
- iii) CPU Scheduling

c) With the help of a Gantt Chart for the following data calculate Average Waiting Time and Turnaround time for a preemptive SJF and round robin. Assume the time quantum to be =2ms. (4)

Process	Arrival Time	Burst Time
P1	0	8
P2	4	5
P3	3	2
P4	2	1

d) Why do application programmer prefer programming according to an API rather than invoking the actual system call (1)

P.T.O.

4 a) Write the general structure of a critical section solution. Write a solution to First Readers-writers problem using semaphores. Explain. (1+3)

b) What is the problem with priority scheduling. How is it overcome. (1+1)

c) Explain the advantages of process cooperation. (2)

d) Write a short note on two level directory. (2)

5 a) Describe the different file attributes. (2)

b) Explain the working of a boot sector virus with a neat diagram. (2+1)

c) Consider the following Reference String.

1,2,3,4,5,3,4,1,6,7,8,7,8,9,7,8,9,5,4,5,4,2 . Show steps with 4 page frames and find the number of page faults and page hits for an Optimal Page Replacement . Assume the page frames to be empty initially. (3)

d) Explain the layered structure of Unix Operating system with a help of a neat diagram. (2)

P.T.O.

6 a) Resource type A has 12 instances, resource type B has 4 instances, and resource type C has 6 instances. Consider the following snapshot of the system. If process P3 makes a request of (2,1,0) will the system be safe .

Show all the steps involved in finding the safety of the system. (5)

	Allocation			Max		
	A	B	C	A	B	C
P ₀	2	1	0	9	4	2
P ₁	2	0	0	3	2	2
P ₂	3	0	1	9	0	2
P ₃	2	1	1	4	2	2
P ₄	0	0	2	4	3	3

b) Explain the data structures that are required to implement Bankers Algorithm. (2)

c) Mention the three components of a LINUX System. Explain. (3)
