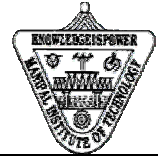


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MANIPAL INSTITUTE OF TECHNOLOGY
 (Constituent Institute of Manipal University)
 MANIPAL -576104



FIFTH SEMESTER B. E. END SEMESTER EXAMINATION DEC – 2007
OPERATING SYSTEMS AND UNIX (CSE –307)
 (10 POINT CREDIT SYSTEM)
 08-12-2007 (2-5PM)

TIME DURATION : 3 HRS

MAX.MARKS : 50

Instructions to Candidates

- Answer **ANY FIVE FULL** questions:

1A. Explain the concept of virtual machines. Write a program in C to create a new process that lists the users currently logged on to the system and parent waits till the child process terminates. **5 Marks**

1B. With the help of diagrams, explain the current activities of a process when it executes and PCB of that process. **5 Marks**

2A. Differentiate between a Process and a Thread. Discuss the following threading issues to be considered in multithreaded programs:

- i) fork() and exec() system calls
- ii) Thread cancellation
- iii) Thread pools

5 Marks

2B. With necessary diagram explain multilevel queue scheduling. For the following set of processes with the length of CPU burst time and arrival time in milliseconds is given:

Process	Arrival Time	Burst Time	Priority
P1	0	6	2
P2	1	3	1
P3	2	1	4
P4	3	5	2

Draw the Gantt chart and calculate average waiting time, average turn around time for Preemptive Priority scheduling algorithm. **5 Marks**

3A. Clearly show that with the general definition of semaphores with busy waiting, the value is never negative but with *spinlock* may have negative semaphore values. **5 Marks**

3B. What are two methods incurred to eliminate deadlocks in a system using process termination method. Consider a system with P_0 through P_4 and three resource types A, B, C. Assume resource type A has 10 instances, resource type B has 5 instances and resource type C has 7 instances. Following is the Maximum and Allocation matrices to the processes:

	Allocation			Max		
	A	B	C	A	B	C
P0	0	1	0	7	5	3
P1	2	0	0	3	2	2
P2	3	0	2	9	0	2
P3	2	1	1	2	2	2
P4	0	0	2	4	3	3

- Check whether the system remains in safe state or not at time $t=t_0$. Give the safe sequence.
- At time $t_1 > t_0$, Process P_4 requests additional resources (3 3 0). Check whether this request could be granted and safety of the system. **5 Marks**

4A. What is meant by external fragmentation? Specify the solutions to deal with external fragmentation. The following measurements are obtained from a system that uses a linear segmented memory with TLB.

- Number of entries in TLB=16
- Time taken to conduct an associative search in TLB=160ns
- Main memory access time=1 μ s

Determine the average access time assuming a TLB hit ratio of 0.75 . **5 Marks**

4B. Explain how computer will slow down because of demand paging with appropriate example. Explain how operating system monitors the working set of each process using working set model. **5 Marks**

5A. What is the protection mechanism provided for controlled access of file in multi-user system. Explain tree structured directories. Explain searching for a file, creation and deletion of directory in this scheme. **5 Marks**

5B. Suppose that a disk drive has 200 cylinders, numbered 0 to 199. disk head is initially at cylinder 53. the disk queue has the following request for I/O to blocks on cylinders:98, 183, 37, 122, 14, 124, 65, 67. Indicate the total head movement using the following disk scheduling algorithms:

- SCAN
 - LOOK
 - C-SCAN
 - C-LOOK
- 5 Marks**

6A. Explain the owner and control operations to the content of access matrix with appropriate example. **5 Marks**

6B. With the relationship between priorities and time-slice length explain the linux scheduler supported with the run queue, active array and expired array. Use diagrams where ever necessary. **5 Marks**

