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MANIPAL INSTITUTE OF TECHNOLOGY
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FIFTH SEMESTER B.Tech. (CSE) DEGREE END SEMESTER EXAMINATION
December. 2013
OPERATING SYSTEMS AND LINUX (CSE 309)
DATE: 12-12-2013

TIME: 3 HOURS **MAX.MARKS: 50**

Instruction to Candidates

- **Answer any 5 full questions.**

1A. What are the different zones for identifying the regions of memory in Linux? Also mention the relationship between zone and physical memory on the Intel 80x86.
1B. What is a file? Describe the different file attributes.
1C. Explain Inverted Page table scheme with neat diagram.
1D. Explain the data structure of swapping used in Linux with neat diagram . (1+3+3+3)

2A. Explain Dual Mode Operation with neat diagram .
2B. List all the roles of Operating System with respect to File-System management.
2C. Explain VMware architecture with neat diagram
2D. Define the following terms
i. PCB
ii. Garbage collection
iii. Demand paging
iv. External fragmentation
(2+1+3+(1+1+1+1))

3A. Given memory partitions of 100KB, 500KB, 200KB, 300KB, 600KB (in order). How would best fit and worst fit algorithms place processes of size 212KB, 417KB,112KB and 426KB ?
3B. What are different file Types with respect to file system?
3C. Explain the different scheduling queues with associated with process scheduling with neat diagram mentioning all events once the process is allocated.
3D. Explain Pentium paging with neat diagram. (2+2+3+3)

4A. Calculate the average turnaround time, average waiting time and draw the Gantt chart for the following Table 1 using preemptive priority algorithm. Assume low priority value has highest priority.

Table 1

Process	Arrival Time	Burst Time	Priority
P1	3	8	3
P2	1	4	1
P3	2	9	4
P4	0	5	5

4B. Explain the effect of boot-sector computer virus with neat diagram.

4C. What is VFS with respect to Linux system? Give different objects and their representation.

4D. What are different flags associated with clone()? (4+2+2+2)

5A. What is the relationship between priorities and time-slice length in Linux scheduling? Explain with diagram.

5B. Give code for Second-Readers-writers problem.

5C. List 3 models of Multithreading. Which model shows true concurrency? Justify.

5D. Resource type A has 12 instances, resource type B has 4 instances, and resource type C has 6 instances. Consider the following snapshot shown in Table 2. If process P3 makes a request of (2,1,0) will the system be safe ? Show all steps . (2+2+2+4)

Table 2

	Allocation			Max		
	A	**B**	**C**	**A**	**B**	**C**
P_O	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

6A. What are the different scenarios of thread cancellation with its advantages of disadvantages ?

6B. Explain domain structure with respect to system protection with neat diagram.

6C. Consider the following page reference stream:

Reference string = 0,1,2,3,0,1,4,0,1,2,3,4

i. Calculate the number of page faults when number of frames is equal to 3 and 4 using FIFO algorithm. What is the anomaly present in this situation?

ii. Find number of page faults in LRU page replacement algorithm using number of frames equal to 3.

iii. Calculate the number of page faults in optimal method page replacement algorithm with number of frames equal to 3.

6 D. Give Monitor solutions for Dining Philosopher's problem.

(2+2+3+3)