Reg. No.										

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

V SEMESTER B.TECH (COMPUTER SCIENCE AND ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2015

SUBJECT: OPERATING SYSTEM & LINUX [CSE 309]

REVISED CREDIT SYSTEM

TIME : 3 Hours 4-12-2015 MAX. MARKS : 50

Instructions to Candidates

- Answer **ANY FIVE FULL** Questions
- Missing data- if any, can be suitably assumed

1A. What is a Process? Draw and explain its different state transitions. How process is represented in the operating system? Expalin with Diagram. 5M

1B. How ordinary Pipes can be used to communicate with two processes in Linux/Unix? Explain with a simple program in C. 3M

1C. Explain Dual-Mode Operation of Operating System with the help of neat Diagram. 2M

2A. Consider the following scenario of processes with their priority:

Process	Arrival Time	Execution Time	Prority
P1	0	5	2
P2	2	4	1
P3	3	7	3
P4	5	6	4

Draw the Gantt chart for the execution of the processes, showing their start time and end Time,using priority-number based scheduling. Calculate turnaround time, normalized turnaround time, waiting time for each process, and average turnaround time,average normalized turnaround time, and average waiting time for the system. 4M

2B. Explain different Multithreading Models with Neat Diagrams. What are the benifits of multithreaded programming? 4M

2C. What are the four circumstances in which CPU-scheduling decisions may take palce? 2M

3A. What are the Conditions for Deadlock to occour? Briefly explain

In a system, the following state of processes and resources are given:

R1→P1, P1→R2, P2→R3, R2→P2, R3→P3, P3→R4, P4→R3, R4→P4, P4→R1, R1→P5

Draw Resource Allocation Graph for the system and check for deadlock condition. Explain your answer. 4M

3B. Consider a system with four processes that use the resource R1, whose instances are 15. Each process declares its maximum demand of resources in advance, as shown in the following space. What will be the situation in the system at time instants t1, t2, t3? Explain.

Process	Maximum Demand	Demand at time instants		
		t1	t2	t3
P1	9	6		
P2	4	2	3	
P3	6	3		1
P4	8	2		

4M

3C. What are the requirements for a solution to the critical-section problem? Explain. 2M

4A. Explain with neat diagram Paging implementation with translation look-aside buffer[TLB]. How Total Memory access Time can be reduced with this? Explain how effective access time is depend upon hit ratio in TLB. 5M

4B. How Memory protection in a paged enviromment is accomplished by protection bits associated with each frame? Explain with a diagram. 3M

4C. A process of size 200MB needs to be swapped into the hard disk. But there is no space in memory. A process of size 250 MB is lying idle in memory and therefore, it can be swapped out. How much swap time is required to swap-in and swap-out the processes if:
Average latency time of hard disk = 10 ms
Transfer rate of hard disk=60 MB/s 2M

5A. Calculate the number of page faults for the following reference string using second-chance algorithm with frame size 3 and comapre the result with FIFO algorithm.
5 0 2 1 0 3 0 2 4 3 03 2 1 3 0 1 5 5M

5B. Write a descriptive note on File-System Mounting with suitable diagrams and commands in Linux Operating System. 3M

5C. What is thrashing? How to limit its effects using a local replacement algorithm? 2M

6A. Consider a disk queue with I/O requests on the following cylinders in thier arriving order:
54, 97, 73, 128, 15, 44, 110, 34, 45
The disk head is assumed tobe at Cylinder 23.
(i) Calculate and show with diagram the disk head movement using FCFS-scheduling algorithm.
(ii) Calculate and show with diagram the disk -head movement using SSTF-scheduling algorithm. 4M

6B. Draw and explain Slab Allocator in Linux. 3M

6C. Draw and explain the Components of Full Linux System. 3M

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