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Question Paper Code : 27167

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Fifth Semester

(Electronics and Instrumentation Engineering/Instrumentation and Control Engineering)

CS 6401 — OPERATING SYSTEMS

(Common to Fourth Semester Computer Science Engineering and Information Technology)

(Regulations 2013)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Compare and contrast DMA and Cache memory.
2. Write the difference between Batch Systems and Time sharing systems.
3. What are the differences between user level threads and kernel level threads? Under what circumstances is one type better than the other?
4. What is the concept behind strong semaphore and spinlock?
5. In memory management consider the program named as Stack1 which size is 100 KB. This program is loaded in the main memory from 2100 to 2200 KB. Show the contents of the page map table for the given scenario.
6. Define demand paging in memory management. What are the steps required to handle a page fault in demand paging?
7. A disk has 26310 cylinders, 16 tracks and 63 sectors. The disk spins at 7200 rpm. Seek time between adjacent track is 1 ms. How long does it take to read the entire disk?
8. Identify the two important functions of Virtual File System (VFS) layer in the concept of file system implementation.
9. Enumerate the requirements for Linux system administrator. Brief any one.
10. Why Virtualization is required?

PART B — (5 × 16 = 80 marks)

11. (a) (i) With neat sketch discuss computer system overview. (8)

(ii) Enumerate the different operating system structures and explain with neat sketch. (8)

Or

(b) (i) State the basic functions of OS and DMA. (6)

(ii) Explain system calls system programs and OS generation. (10)

12. (a) Consider the following process, with the CPU burst time given in milliseconds

Process	Burst Time	Priority
P_1	10	3
P_2	1	1
P_3	2	3
P_4	1	4
P_5	5	2

Processes are arrived in P_1, P_2, P_3, P_4, P_5 order at time 0.

(i) Draw Gantt charts to show execution using FIFO SJF, non-preemptive priority and Round Robin (Quantum = 1) scheduling (10)

(ii) Also calculate waiting time and turn around time for each scheduling algorithms. (6)

Or

(b) (i) Explain thread and SMP management. (8)

(ii) Illustrate semaphores with neat example. (4)

(iii) The operating system contains 3 resources, the number of instance of each resource type are 7, 7, 10. The current resource allocation state is as shown below.

Process	Current Allocation			Maximum Need		
	R_1	R_2	R_3	R_1	R_2	R_3
P_1	2	2	3	3	6	8
P_2	2	0	3	4	3	3
P_3	1	2	4	3	4	4

Is the current allocation in a safe state? (4)

13. (a) Discuss the given Memory Management techniques with diagrams

(i) Partition Allocation Methods (8)

(ii) Paging and Translation Look-aside Buffer. (8)

Or

(b) (i) Consider the following page-reference string :

1, 2, 3, 2, 5, 6, 3, 4, 6, 3, 7, 3, 1, 5, 3, 6, 3, 4, 2, 4, 3, 4, 5, 1

Indicate page faults and calculate total number of page faults and successful ratio for FIFO, optimal and LRU algorithms. Assume there are four frames and initially all the frames are empty. (12)

(ii) Explain the effect of thrashing. (4)

14. (a) On a disk with 200 cylinders, numbered 0 to 199, compute the number of tracks the disk arm must move to satisfy the entire request in the disk queue. Assume the last request received was at track 100. The queue in FIFO order contains requests for the following tracks. 55, 58, 39, 18, 90, 160, 150, 38, 184. Perform the computation to find the seek time for the following disk scheduling algorithms.

(i) FCFS

(ii) SSTF

(iii) SCAN

(iv) C-SCAN

(v) LOOK. (16)

Or

(b) (i) Discuss the functions of files and file implementation. (8)

(ii) Explain free space management with neat example. (8)

15. (a) Write about Linux Architecture and LINUX kernel with neat sketch. (16)

Or

(b) Explain in detail about LINUX multifunction server, DNS VMware on Linux host. (16)