Reg. No. :

Question Paper Code : 52394

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Seventh Semester
Computer Science and Engineering
CS2411 – OPERATING SYSTEMS
(Common to : Electrical and Electronics Engineering/ Electronics and Instrumentation Engineering/Instrumentation and Control Engineering)
(Regulations 2008)
(Also Common to PTCS2411 – Operating Systems for B.E. (Part-Time) Sixth Semester – CSE – Regulations 2009)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. Define PCB. Where is it used ?
2. Which one is preferred, a multithreaded process or multiple identical processes ? Why ?
3. Differentiate preemptive and non-preemptive scheduling.
4. What is meant by busy waiting by processes ?
5. Will optimal page replacement algorithm suffer from Belady's anomaly ? Justify your answer.
6. Recall the difference between internal and external fragmentation.
7. What is the need for an access control list ?
8. What is the purpose of free space list ?
9. How is memory-mapped I/O performed ?
10. What is the advantage of RAID ?

PART – B (5×16=80 Marks)

11. a) i) Describe the services provided by an operating system. (8)

ii) Explain the structure of a virtual machine with a neat diagram. (8)

(OR)

b) Explain how Inter Process Communication is provided by a message-passing system.

12. a) Analyze the need for synchronization with producer-consumer problem and discuss the solution to the critical section problem.

(OR)

b) Consider the following set of processes, with the length of 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

The processes are assumed to have arrived in the order P_1, P_2, P_3, P_4, P_5, all at time 0.

i) Draw four Gantt charts illustrating the execution of these processes using FCFS, SJF, a non preemptive priority (a smaller priority number implies a higher priority) and RR (quantum = 1) scheduling. (6)

ii) What is the turnaround time of each process for each of the scheduling algorithms in part (i) ? (5)

iii) What is the waiting time of each process for each of the scheduling algorithms in part (i) ? (5)

13. a) Consider the reference string :

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

Simulate the operation of page replacement algorithms (LRU, FIFO and Optimal) assuming 5 frames. Rank these algorithms according to their page-fault rate.

(OR)

b) i) Given memory partitions of 100 K, 500 K, 200 K, 300 K and 600 K (in order), how would each of the First-fit, Best-fit and Worst-fit algorithms place processes of 212 K, 417 K, 112 K and 426 K (in order) ? Which algorithm makes the most efficient use of memory ? (6)

ii) Why are segmentation and paging sometimes combined into one scheme ? Explain with a neat diagram. (10)

14. a) Describe the following allocation methods for file management and compare them.

i) Contiguous allocation (4)

ii) Linked allocation (6)

iii) Indexed allocation. (6)

(OR)

b) Describe the following schemes for defining the logical structure of a directory.

i) Two-Level Directory (4)

ii) Tree-Structured Directories (6)

iii) Acyclic-Graph Directories. (6)

15. a) Suppose that a disk drive has 200 cylinders, numbered 0 to 199. The drive is currently serving a request at cylinder 100. The queue of pending requests, in FIFO order is 55, 58, 18, 90, 160 and 38. Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests, for each of the following disk scheduling algorithms ?

SSTF, SCAN, LOOK and C-SCAN.

(OR)

b) i) Explain the steps in DMA transfer with a neat diagram. (8)

ii) Summarize the interrupt-driven I/O cycle with a neat diagram. (8)

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