T 8121

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2006.

Fourth Semester

Computer Science and Engineering

CS 1252 — OPERATING SYSTEMS

(Common to B.E. (Part-Time) Third Semester R 2005)

(Regulation 2004)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   What are the main purposes of an Operating System?

2.   What is the main advantage of multiprogramming?

3.   What is the main difficulty that a programmer must overcome in writing an operating system for a real-time environment?

4.   What are the main advantages of the microkernel approach to system design?

5.   Explain the difference between Logical address and Physical address space.

6.   What are the necessary conditions for the occurrence of a deadlock?

7.   What are the advantages of having an inverted page table?

8.   What are the major activities of an operating system in regard to process management?

9.   What advantage is there in having different time-quantum sizes on different levels of a multilevel queueing system?

10. Why are segmentation and paging sometimes combined into one scheme?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Discuss briefly the various issues involved in implementing Inter Process Communication (IPC) in message passing system. (8)

       (ii) Explain the free space management using Bit Vector and Linked list methods. (8)

Or

(b) (i) Explain how hardware protection can be achieved. (7)

       (ii) Explain long term, medium term and short term scheduler. (6)

       (iii) What is a real time system? (3)

12. (a) Assume the following workload in a system. All jobs arrive at time 0 in the order given

Job	Burst time (ms)	Priority
A	8	2
B	4	1
C	5	4
D	2	2
E	1	3

       (i) Draw a Gantt chart illustrating the execution of these job using FCFS, RR (quantum = 4), non preemptive priority (a smaller priority number implies a higher priority) and SJF CPU scheduling. (8)

       (ii) Calculate the average waiting time and average turnaround time for each of the above scheduling algorithm. (8)

Or

(b) Discuss the critical section problem, solving the Dining philosophers' problem using semaphores.

13. (a) Consider the following snapshot of a system. Execute Banker's algorithm to answer the following.

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	2	0	1	2	2	0	1	2	2	4	2	1
P1	1	0	0	0	2	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	7	5	2				
P4	0	0	1	4	0	7	5	6				

(i)   Is the system in a safe state? If the system is safe, show how all the process could complete their execution successfully. If the system is unsafe, show how deadlock might occur. Explain.   (6)

(ii) If a request from process P_1 arrives (1, 4, 2, 0) can the request be granted?   (10)

Or

(b)   Explain the difference between External Fragmentation and Internal Fragmentation? How to solve the fragmentation problem using paging?   (6 + 10)

14. (a)   Consider the following page reference string :

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

Calculate the number of page faults would occur for the following page replacement algorithm with frame size of 3 and 5.   (16)

(i)   LRU   (ii)   FIFO   (iii)   Optimal.

Or

(b)   Briefly explain the Disk Management and Swap-Space management.   (8 + 8)

15. (a)   Explain the various file allocation methods and discuss advantages and disadvantages in those schemes.   (16)

Or

(b)   Explain the different disk scheduling algorithms with neat diagrams. (16)

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