L 1056

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2006.

Fourth Semester

Computer Science and Engineering

CS 1252 — OPERATING SYSTEMS

(Regulation 2004)

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

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Distinguish between tightly coupled systems and loosely coupled systems.

2. List the responsibilities of the operating system in connection with disk management.

3. What is a context switch? Discuss.

4. State what does a thread share with peer threads?

5. List the four conditions for deadlock.

6. Discuss the terms : Logical address; Physical address.

7. Define internal fragmentation.

8. What data type is a file?

9. In the context of disk scheduling define seek time.

10. In the context of disk reliability define mirroring.

PART B — (5 × 16 = 80 marks)

11. Consider, a disk queue with requests for I/O to blocks on cylinders in following order :

98, 183, 37, 122, 14, 124, 65, 67

The disk head is initially at cylinder 53. Discuss how the following di scheduling algorithms will work for the above data set.

(i) First Come First Serve Scheduling.

(ii) Shortest Seek Time First Scheduling.

(iii) SCAN scheduling.

Compute the total head movement for each algorithm. Also comment i terms of performance.

12. (a) (i) Explain the features of real time system and time sharing system. (8)

(ii) Explain how memory, cpu and I/O protection is achieved? Also explain the dual mode of operation. (8)

Or

(b) (i) Explain how parameters can be passed to system calls. (6)

(ii) Explain the process state diagram. (4)

(iii) Explain long term scheduling, medium term scheduling and short term scheduling. (6)

13. (a) Consider the following five processes, with the length of the CPU burst time given in milliseconds.

PROCESS	BURST TIME
P_1	10
P_2	29
P_3	3
P_4	7
P_5	12

Consider the First Cum First Serve (FCFS), Non Preemptive Shortest Job First (SJF), Round Robin (RR) (quantum=10 milliseconds) scheduling algorithms. Illustrate the scheduling using Gantt Chart. Which algorithm will give the minimum average waiting time? Discuss. (16)

Or

(b) (i) State the critical section problem. Then, list and discuss the three requirements that a solution to the critical section problem must satisfy. (8)

(ii) Explain the structure of a semaphore, wait and signal to overcome busy waiting. (8)

14. (a) (i) Construct a Resource Allocation Graph for the following scenario. At time '*t*' process P_1 requests for a resource R_1, process P_2 requests for a resource R_2. Both the resources are available and they are allocated to the requesting process. At time t_1 where $t_1 > t$, both the processes are still holding the resources, however process P_1 requests for R_2 which is held by P_2, process P_2 requests for R_1 held by P_1. Will there be a dead lock? If there is a deadlock discuss the four necessary conditions for deadlock. (8)

(ii) To eliminate deadlock using resource preemption, three issues need to be addressed. List and discuss the three issues. (8)

Or

(b) (i) Consider the following memory allocation at a point of time '*t*' :

0 K	Operating System
400 K	Process P_1
800 K	Free Space
1025 K	Process P_2
1450 K	Free Space
1650 K	Process P_3
2000 K	

Assume the total memory available is 2000 K, out of which 400 K is occupied by the resident part of the operating system. At this point of time a process P_4 with a memory requirement of 300 K arrives. Can memory be allocated to the arriving process if a contiguous memory allocation scheme is adopted? If yes discuss how? If no, discuss the reasons and then state what technique can be adopted to allocate memory to process P_4? (8)

(ii) With a suitable example discuss First fit, Best fit and Worst fit strategies for memory allocation. (8)

15. (a) (i) State the reasons for page fault. Then, discuss the various techniques for handling page faults. (10)

(ii) What is thrashing? When is a process said to be thrashing? Discuss. (6)

Or

(b) Discuss the three techniques how files can be allocated space on disk. Give relevant example and diagrammatic illustration. (16)
