K 1347

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2004.

Fifth Semester

Computer Science and Engineering

CS 333 — OPERATING SYSTEMS

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. What is Time Sharing System?

2. What is the main advantage of the layered approach to system design.

3. What is job scheduler? What is CPU scheduler?

4. What are the various process states? Depict process state diagram.

5. Explain any four scheduling criteria involved in CPU scheduling.

6. Consider a logical address space of eight pages of 1024 words each, mapped onto a physical memory of 32 Frames. How many bits are there in logical address?

7. What is sequential access method? Mention its merits and demerits.

8. Define single level directory structure. Give one example.

9. What is a bit vector?

10. Mention any two features of linux file system.

PART B — (5 × 16 = 80 marks)

11. (i) Describe Working–Set model. (10)

(ii) Describe paging with illustrative example. (6)

12. (a) (i) Consider the following set of processes, with the length of the CPU burst time given in milliseconds.

Process	Burst time	Priority
P_1	8	3
P_2	3	1
P_3	4	4
P_4	2	2
P_5	6	5

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

(1) Draw four Gantt charts illustrating the execution of these processes using FCFS, SJF, a nonpreemptive priority (a smaller priority number implies a higher priority) and RR (quantum = 2) scheduling.

(2) What is the turn around time of each process for each of the scheduling algorithms in part (1).

(3) What is the waiting time of each process for each of the scheduling algorithms in part (1).

(4) Which of the schedules in part (1) results in the minimal average waiting time (over all processes). (12)

(ii) Explain the three requirements that a solution to critical-section problem must satisfy. (4)

Or

(b) (i) Describe an algorithm which satisfies all the conditions of critical section problem and also prove how it satisfies all the conditions. (6)

(ii) Describe deadlock prevention methods

(1) Hold and wait

(2) Circular wait

(3) No preemption.

(10)

13. (a) (i) Describe external and internal fragmentation with illustrative examples. (8)

(ii) Describe segmentation with its hardware. (8)

Or

(b) (i) Describe multilevel paging with example. (8)

(ii) Describe hardware support of paging with TLB. (8)

14. (a) Describe page replacement algorithms

(i) FIFO algorithm

(ii) Optimal algorithm

(iii) LRU algorithm with illustrative example. (16)

Or

(b) (i) Describe the layered design of file-system organisation. (10)

(ii) Describe file-system mounting. (6)

15. (a) Describe the following methods for allocating disk space.

(i) Linked allocation.

(ii) Contiguous allocation. (16)

Or

(b) (i) Describe components of a Linux system. (8)

(ii) Describe process scheduling in Linux system. (8)
