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B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2008.

Fifth Semester

Information Technology

CS 1252 — OPERATING SYSTEMS

(Regulation 2004)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define Real Time Operating System.

2. Define SYSTEM CALLS.

3. What do you mean by a critical section problem?

4. Define the use of monitor.

5. Describe the four necessary conditions for deadlocks.

6. Why should paging be used by operating systems?

7. Define virtual memory.

8. What is the cause of thrashing?

9. What is the Kernel of an operating system?

10. Mention the importance of swap-space management.

PART B — (5 × 16 = 80 marks)

11. (a) (i) How does multi programming help in achieving improved utilization of a computer system? (8)

    (ii) With necessary diagram explain the term "process" from the operating system point of view. (8)

Or

(b) (i) Briefly explain the four major functions of an operating system. (8)

    (ii) Give the main features of the following types of OS outlining their limitations and strengths : Interactive Time sharing OS, Real Time OS. (8)

12. (a) Consider the following set of processes, with the length of CPU-burst time given in millisecond. (16)

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 order P_1, P_2, P_3, P_4, P_5 all at time 0. (i) Draw 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 (ii) What is the turn around time of each process for each of the scheduling algorithms in part (i)?

Or

(b) (i) What two advantages do threads have over multiple processes? What major disadvantage do they have? Suggest one application that would benefit from the use of threads, and one that would not. (6)

    (ii) Define the requirement of the correct solution. How semaphores are used to solve dining philosophers problem. (10)

13. (a) An operating System contains three resource classes, namely R_1, R_2 and R_3. The number of resource units in these classes is 7, 7 and 10 respectively. The current resource allocation state is as shown below : (16)

Process Allocated Resources Maximum Requirement

	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

(i) Is the current allocation state safe? (4)

(ii) Would the following requests be granted in the current state?

    (1) Process P_1 requests (1, 1, 0) (4)

    (2) Process P_3 requests (0, 1, 0) (4)

    (3) Process P_2 requests (0, 1, 0) (4)

Or

(b) (i) Explain some of the most common techniques for structuring the page table. (8)

(ii) Explain the principles of segmentation with examples. (8)

14. (a) Consider the following page reference string : (16)

1, 2, 7, 8, 3, 4, 2, 1, 4, 2, 5, 6. How many page faults would occur for the following page replacement algorithms, assuming an allocation of 3 frames?

(i) LRU (5)

(ii) FIFO (5)

(iii) Optimal. (6)

Or

(b) (i) Explain the concept of demand paging. (8)

(ii) How does the system detect trashing? Once it detect trashing what can the system do to eliminate this problem? (8)

15. (a) (i) Describe the salient features of the file system of UNIX. (8)

        (ii) Explain UNIX buffer cache mechanism. (8)

<div align="center">Or</div>

   (b) (i) Explain the different disk scheduling Techniques. (8)

        (ii) Explain different directory implementation methods. (8)

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