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Question Paper Code : 65110

5 Year M.Sc. DEGREE EXAMINATION, MAY/JUNE 2013.

Fourth Semester

Software Engineering

ESE 042 — OPERATING SYSTEM AND SYSTEM SOFTWARE

(Regulation 2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define system software.
2. Distinguish assembler and interpreter.
3. What does the CPU do when there are no user programs to run?
4. What is the principal advantage of the multiprogramming?
5. List the three requirements that must be satisfied by critical-section problem.
6. What is internal fragmentation?
7. Define Semaphore.
8. Write the three ways to deal the deadlock problem.
9. List out the free space management techniques.
10. Give an example of a situation where variable-size records would be useful.

PART B — (5 × 16 = 80 marks)

11. (a) Explain in detail the design of a two pass assembler. (16)

Or

(b) Explain the following in detail : (16)

(i) Linkage Editor

(ii) Elements of Assembly Language Programming

(iii) Macro Preprocessor.

12. (a) (i) Discuss the operating system structure and its components. (8)

(ii) Explain about the distributed systems. (8)

Or

(b) (i) Discuss the Process Control Block. (4)

(ii) Describe the differences among short-term, medium-term, and long-term scheduling. (4)

(iii) Describe the Inter Process Communication facility available in operating system. (8)

13. (a) Consider the following set of processes, with the length of the CPU — burst time given in milliseconds. The process are assumed to have arrived in order P1, P2, P3, P4, P5, all at time 0. (16)

Process	Burst Time	Priority
P1	10	3
P2	1	1
P3	2	4
P4	1	5
P5	5	2

(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.

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

(iii) What is the waiting time of each process for each of the scheduling algorithm in part (a)?

(iv) Which of the schedules in part a results in the minimal average waiting time (over all processes)?

Or

(b) (i) Explain the readers-writers problem using semaphores. (8)

(ii) Discuss how the dinning philosopher's problem can be solved by monitors. (8)

14. (a) (i) Explain Banker's deadlock-avoidance algorithm with an illustration. (8)

(ii) Discuss how deadlocks can be avoided and detected. (8)

Or

(b) Discuss segmentation in detail. Compare it with paging. (16)

15. (a) Consider the page-reference string : 2 3 2 1 5 2 4 5 3 2 5 2. How many page faults occur for the following replacement algorithms, assuming three frames? (16)

(i) FIFO replacement

(ii) LRU replacement

(iii) Optimal replacement.

Or

(b) Explain in detail disk scheduling algorithms with suitable example. (16)
