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Question Paper Code : 81329

M.E. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Second Semester

Computer Science and Engineering

CS 9222/CS 922 — ADVANCED OPERATING SYSTEMS

(Common to M.E. Mobile and Pervasive Computing)

(Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the advantages and disadvantages of separating policies from mechanisms in the design of operating systems?
2. Differentiate between deadlock and starvation.
3. Define Causal ordering.
4. How to measure the performance of a mutual exclusion algorithm?
5. Define the two important goals of distributed file system.
6. Identify the overheads in a load sharing policy.
7. What are the advantages and disadvantages of asynchronous checkpointing?
8. List the characteristics of atomic actions.
9. Differentiate between tightly-coupled and loosely coupled system.
10. What are the requirements of a database operating systems?

PART B — (5 × 16 = 80 marks)

11. (a) (i) How to verify the correctness of parallel programs using axioms?
Explain with suitable example. (8)
- (ii) Describe the classification of advanced operating systems in detail. (8)

Or

- (b) (i) What is general resource graph and what are the conditions it should satisfy? Show a general resource graph that cannot be completely reduced, but represents a system state that is free from deadlock. (8)
- (ii) What is semaphore and how it is used to implement mutual exclusion? Give semaphore solution to reader's priority problem and explain. (8)
- 12. (a) (i) Write a short note on Global state and consistent cuts. (6)
- (ii) Illustrate Lamport's algorithm to achieve mutual exclusion with suitable example. (10)

Or

- (b) Illustrate distributed deadlock detection algorithm with suitable example. (16)
- 13. (a) (i) How to select a suitable load sharing algorithms? (6)
- (ii) Describe the issues in the design of task migration and the mechanisms in task migration facilities in distributed operating systems. (10)

Or

- (b) (i) Describe the architecture and motivation of distributed shared memory system. (8)
- (ii) "In the design of a distributed file system, consistency, availability and performance are conflicting properties". Justify. (8)
- 14. (a) (i) What are the two ways to implement backward-error recovery? Explain. (8)
- (ii) Describe the scheme for asynchronous checkpointing and recovery. (8)

Or

- (b) (i) What are the problems caused by rolling back of processes? Explain in detail. (6)
- (ii) Describe the working of autonomous vote reassignment protocol. (10)
- 15. (a) (i) Describe the major causes of performance degradation in multiprocessor systems and give the strategies to address these problems. (8)
- (ii) Give the time-stamp-based concurrency control algorithm and explain why these algorithms are free from deadlock? (8)

Or

- (b) (i) What are the advantages and disadvantages of implementing thread package at user-level and kernel-level. (8)
- (ii) What is the serializability condition for a fully-replicated database systems? Prove that if there is at most one conflict between any two transactions then any interleaved execution will be serializable. (8)
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