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10/6/14 FN

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Question Paper Code : 61208

M.E. DEGREE EXAMINATION, MAY/JUNE 2014.

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 relative advantages and disadvantages of layered approach for operating system over kernel based approach?
2. What is meant by consumable and reusable resources?
3. What are the limitations of Lamport's clock?
4. Differentiate between synchronous and asynchronous computing.
5. What are the similarities and differences between load sharing and load balancing?
6. Differentiate between weak consistency and release consistency.
7. What are the advantages and disadvantages of synchronous checkpoint and recovery?
8. List the characteristics of atomic actions.
9. Compare tightly-coupled and loosely-coupled systems.
10. What are the requirements of database operating systems?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Describe classification of advanced operating systems. (8)
(ii) Assume a system has P processes and R identical units of reusable resources. If each process can claim at most two unit of resources, show that the system will be deadlock free if and only if $P \leq R - 1$. (8)

Or

- (b) (i) Illustrate Owicki-Gries axiomatic method for verification of parallel program with help of an example. (10)
(ii) Compare and contrast the communication and synchronization mechanisms in Ada and CSP. (6)
12. (a) (i) Describe interactive convergence and interactive consistency fault-tolerant clock synchronization algorithms. (8)
(ii) Illustrate Chandy-Misra-Hass's edge chasing algorithm for distributed deadlock detection. (8)

Or

- (b) (i) Show that Byzantine agreement cannot always be reached among four processors if two processors are faulty. (8)
(ii) Illustrate the generalized non-token-based mutual exclusion algorithm for distributed systems. (8)
13. (a) (i) Explain the following sentence. "Consistency, availability and performance tend to be contradictory forces in a distributed file systems. (8)
(ii) Discuss about the issues in designing task migration mechanism. (8)

Or

- (b) (i) Explain the architecture of a distributed file system. (6)
(ii) Describe the architecture and motivation of distributed shared memory systems. (10)
14. (a) (i) Discuss about the problems in rolling back the processes in concurrent systems. (8)
(ii) Explain static voting scheme proposed by Gifford. Clearly mention the assumption made in this scheme. (8)

Or

- (b) (i) Explain autonomous vote reassignment protocol. (10)
(ii) Describe an algorithm for check-pointing in DDBS. (6)

15. (a) (i) Briefly compare the structures of various multiprocessor operating systems. (6)
- (ii) Discuss about the issues in designing fault-tolerant multiprocessor operating systems. (10)

Or

- (b) (i) Discuss about various multiprocessor scheduling strategies in detail. (8)
- (ii) Explain why are timestamp-based concurrency control algorithms free from deadlock. (8)
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