

Seventh Semester Examination – 2007

ADVANCE OPERATING SYSTEM

Full Marks – 70

Time – 3 Hours

Answer Question No. 1 which is compulsory and any **five** from the rest.

The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10
- (a) What is the difference between bus-based multiprocessor and ring based multiprocessor ?
 - (b) Define the term *Distributed System* ?
 - (c) What are the different overheads in a load sharing policy ?

- (d) What are two advantages of a micro-kernel over a monolithic kernel ? 2
- (e) What are the four best-known strategies used to handle deadlocks ? 2
- (f) Why do some distributed system use two-level naming ? 2
- (g) What is the protection state of a system ? 2
- (h) Differentiate between pre-emptive and Non-preemptive transfer of task in distributed system. 2
- (i) Name the four different algorithms to implement distributed shared memory system.
- (j) Define the terms: RPC, RMI, and MPI in the context of Distributed Operation System.
2. (a) Compare the two approaches and explain the ways in which a distributed system can enhance business activities. Give an

- example of a situation where an organization might wish to retain the centralized approach. 5
- (b) Develop a system model for deadlock then using a resource allocation graph illustrate a deadlock. 5
3. (a) Discuss and give example of the following design issues in relation to Distributed Systems :
- (i) load sharing policy
- (ii) Consistency Maintenance 5
- (b) A distributed system may have multiple, independent critical regions. Imagine that process 0 wants to enter critical region A and process 1 wants to enter critical region B. Can Ricart and Agrawala's algorithm lead to deadlocks ? Explain your answer. 5

4. (a) Discuss the different levels of Delivery Guarantees in relation to RPC Call Semantics. 5
- (b) How can Replication be used to enhance system performance and availability? 5
5. (a) With authenticated message, Byzantine consensus is possible with any number of faulty nodes. Argue informally why this is true. 5
- (b) How can the system security design impact on overall system reliability? Within your answer identify typical examples of interaction that could occur. 5
6. (a) In relation to Lamport's Logical Clocks, use a space-time diagram to discuss :
- (i) how the logical clock advances (use diagram)
- (ii) a limitation of the logical clock. 5

- (b) "Compatibility" is the term describing the degree of interoperability among resources and processes in a system, Identify the three levels of compatibility that exist in distributed systems, briefly describing each level. 5
7. (a) What are the essential system functions of microkernel? 2.5
- (b) What are the necessary conditions for a deadlock to occur? 2.5
- (c) What are the different types of transparencies in a distributed system? 2.5
- (d) What is objective of Non-Token Based Distributed Mutual Exclusion algorithm? 2.5
8. Discuss and give examples of the following Implementation Challenges that must be met to ensure the usefulness of Distributed Systems :

- (a) Openness
- (b) Transparency
- (c) Resource Sharing
- (d) Scalability
- (e) Concurrency.

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