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Paper Code : IT-704A

DISTRIBUTED OPERATING SYSTEM

Time Allotted: 3 Hours | *Full Marks:* 70

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

Group – A

(Multiple Choice Type Questions)

1. Choose the correct alternative for *any ten* of the following: http://www.makaut.com 1×10=10

(i) Transparency that allows movement of resources and clients within a system is called

(a) Concurrency transparency (b) Performance transparency

(c) Replication transparency (d) Mobility transparency

(ii) What are design issues in distributed system structure?

(a) Scalability (b) Fault-tolerance

(c) Clustering (d) All of the mentioned

(iii) Which deadlock model is used for resource acquisition?

(a) Single-Unit (b) AND

(c) OR (d) AND-OR

(iv) Different issues to be dealt with in case of designing a distributed system are

(a) Scalability (b) Compatibility

(c) Resource Management (d) All of these

(v) Biggest of the issues in case of designing distributed systems is the absence of a

(a) global system clock (b) global shared memory

(c) Both (a) and (b) (d) None of these

(vi) Which technique is based on compile-time program transformation for accessing remote data in a distributed-memory parallel system?

(a) Cache coherence scheme (b) Computation migration

(c) Remote procedure call (d) Message passing

(vii) The communication protocol for RPC is

(a) Request Protocol (b) Request/Reply protocol

(c) Request/Reply/Ack Reply Protocol (d) All of these

(viii) Chandy-Mishra-Hass algorithm in case of distributed system is for

(a) distributed deadlock detection (b) distributed mutual exclusion

(c) distributed file systems (d) global state recording

(ix) Granularity refers in a distributed shared memory—

(a) page size (b) block size

(c) virtual address space (d) logical address space

(x) Uni-processor computing is known as

(a) Centralized computing (b) Parallel computing

(c) Distributed computing (d) Grid computing

(xi) Threads deal with _____ parallelism.

(a) coarse-grained (b) very fined-grained

(c) medium-grained (d) fine-grained

Group – B

(Short Answer Type Questions)

Answer *any three* of the following. 5×3=15

2. Explain the desirable features of a good global scheduling algorithm.

3. Explain the process migration mechanism in distributed systems.

4. Explain the concept of communication in case of Slotted Ring protocol.

5. Explain the replacement strategy used in distributed shared memory.

6. Briefly describe different deadlock handling strategies in distributed systems.

Group – C
(Long Answer Type Questions)
Answer *any three* of the following. 15×3=45

7. (a) Briefly discuss Ricart-Agarwala Algorithm for Mutual exclusion handling in distributed systems.
   (b) What do you mean by Global State?
   (c) What is Lamport's Logical Clock?
   (d) Differentiate between Tightly Coupled and Loosely Coupled Systems. 5+2+3+5=15

8. (a) Describe blocking and non-blocking types of IPC.
   (b) What are their relative advantages and disadvantages of blocking and non-blocking IPC?
   (c) What do you mean by multidatagram messages?
   (d) What do you mean by LWRPC?
   (e) Describe some techniques used in LWRPC system that makes it more efficient than the conventional RPC system. 3+3+2+2+5=15

9. (a) Name the main components of a distributed file system. What might be the reasons for separating the various functions of a distributed file system into these components?
   (b) In the design of a distributed file system, high availability and high scalability are mutually related properties. Discuss.
   (c) In the design of a distributed file system, high performance and high reliability are mutually related properties. Discuss.
   (d) What is an immutable file? Can a file system be designed to function correctly by using only immutable files? Explain. (1+3)+3+3+(2+3)=15

10. (a) What is path pushing? Differentiate between centralized and distributed deadlock detection process.
    (b) What is drifting of clocks? What is clock skew?
    (c) In case of centralized clock synchronization algorithms, what is the difference between active time server and passive time server algorithms? (2+3)+(3+2)+5=15

11. Write short notes on *any three* of the following: 5×3=15
    (i) Digital Signature
    (ii) Lamport's Distributed Mutual Exclusion Algorithm
    (iii) Stub procedure
    (iv) Micro kernel and Monolithic kernel
    (v) Inter Process Communication (IPC)