Printed Pages : 4

ECS-701

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 110701

Roll No.

B. Tech.

(SEM. VII) (ODD SEM.) THEORY EXAMINATION, 2014-15

DISTRIBUTED SYSTEMS

Time : 3 Hours] [Total Marks : 100

Note : Attempt **all** questions

1 Attempt any **four** parts : 4×5=20

(a) What is a distributed system? Describe the main characteristics of distributed systems. Give two examples of distributed system.

(b) What are commit protocols? Explain how two-phase protocols respond to failure of participating site and failure of co-ordinator.

(c) What do you mean by mutual exclusion in distributed system? What are requirements of a good mutual exclusion algorithm?

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(d) What are Vector clocks? Explain with the help of implementation rule of vector clocks, how they are implemented ? Give the advantages of Vector clock over Lamport clock.

(e) What is Replication and replica manager? Give the architectural model for replicated data.

(f) What is distributed shared memory (DSM)? Explain with diagram the architecture of distributed shared memory.

2 Attempt any **four** parts : **4×5=20**

(a) Explain the following :
  (i) Gossip architecture
  (ii) Quorum consensus methods

(b) What do you mean by recovery in concurrent systems? Explain.

(c) What is Voting protocol? Explain Static voting and Dynamic voting protocols.

(d) Explain the Ricart-Agrawala algorithm for mutual exclusion. Mention the performance of this algorithm.

(e) Define fault and failure. What are different approaches to fault-tolerance? Explain.

(f) Describe the following algorithm for implementing DSM :

  (i) The Migration Algorithm

  (ii) The Full–Replication Algorithm

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3 Attempt any **two** parts : **10×2=20**

(a) (i) What are the goals of distributed transaction? Distinguish between Flat and Nested Transaction along with its structure.

(ii) Explain optimistic concurrency control.

(b) Define forward recovery and backward recovery. List advantages and disadvantages of forward recovery. Explain two approaches of backward-error recovery.

(c) What are agreement protocols? Explain Byzantine agreement problem, the consensus problem and interactive consistency problem. Describe Lamport-shostak-pease algorithm.

4 Attempt any **two** parts : **10×2=20**

(a) What are the advantages and drawback of multiversion timestamp ordering in comparision with the basic timestamp ordering ?

(b) Write short note on :

(i) Livelocks

(ii) Domino effects

(iii) Failure resilient processes

(iv) Consistent Checkpoints

(c) (i) Explain typical architecture of distributed file system. Give the mechanisms for building distributed file system.

(ii) What is caching? How is useful in DFS?

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5 Attempt any **two** parts : **10×2=20**

(a) Give the deadlock handling strategies in distributed systems? What are the differences in centralized, distributed and hierarchical control organizations for distributed deadlock detection?

(b) Why is scalability an important feature in the design of distributed system? Discuss some of the guiding principles for designing a scalable distributed system.

(c) Distinguish between :

(i) Resource deadlock and Communication deadlock.

(ii) Token based and non-token based algorithm.

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