

## Distributed Computing – May 2005

Time : 3 Hrs.]

[Marks : 100

- N.B. :** (1) Questions No. 1 is compulsory.  
 (2) Answer any **four** questions out of the remaining **six** questions.

1. (a) Explain the working of RPC. [6]  
 (b) Describe Lamports clocks. [5]  
 (c) Write a note on Software Agents. Give one practical example. [6]  
 (d) Distinguish between Distributed and Network Operating Systems. [3]
  
2. (a) What is Transparency ? Discuss transparency w.r.t. distributed systems. [10]  
 (b) Define fault tolerance. For a system given bellow design a minimum complexity representation for fault tolerance of 2. System : 5 processors and 2 data resources  $D_1$  and  $D_2$  (Minimise on connectivity). [10]
  
3. (a) What is CORBA ? Explain the working of CORBA as middleware. [10]  
 (b) Explain the working of Distributed File System with one example. [10]
  
4. Compare the following and give example application [20]  
 (a) Message Oriented Communication and Stream Oriented Communication.  
 (b) Decentralized and Centralized algorithms.  
 (c) Data centric consistency model and Code centric consistency model.  
 (d) Process and thread.
  
5. (a) Explain the working of any two physical clock synchronization algorithms. [10]  
 (b) Explain in details TCP/IP protocol suit. [7]  
 (c) What are Message Brokers? [3]
  
6. (a) Explain the working of any one non-centralized mutual exclusion algorithm. [10]  
 (b) What are the different attacks on security of distributed systems ? [10]
  
7. Write short notes on any **four** of the following : [20]  
 (a) Role of client server model in distributed computing model  
 (b) SSP chains for locating mobile entities  
 (c) Commit in distributed transactions  
 (d) Removal of un-referenced entities  
 (e) Logs for recovery  
 (f) CODA files system

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## Distributed Computing – December 2005

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- N.B. :** (1) Questions No. 1 is compulsory.  
 (2) Attempt any **four** of the remaining **six** questions.

1. (a) Explain the design issues w.r.t. distributed computing environment. [8]  
 (b) Compare data centric VS code centric consistency models. [5]  
 (c) What are message Brokers ? Explain. [4]  
 (d) Compare distributed VS network operating system. [3]
  
2. (a) For 3 processors and set of events shown below with per processor vector clock entries initially. Zero shown the find vector clock values. [10]
  
- (b) Explain the working of any one centralized mutual exclusion algorithm. [10]
  
3. (a) Design a 1 fault tolerant distributed system where basic components are 5 processors, 2 data resources, 2 printers and minimum No of required links. [12]  
 (b) Explain synchronization w.r.t. distributed systems. [8]
  
4. (a) Explain the communication system w.r.t. distributed computing. [10]  
 (b) Explain attacks and security in distributed systems. [10]
  
5. (a) Explain a deadlock detection algorithm for distributed system. [10]  
 (b) Explain use and working of CORBA. [10]

6. (a) What are the issues in distributed file system design ? Explain and give one example. [10]  
 (b) What are state full and stateless servers? Explain data and code migration and replication w.r.t. distributed system. [10]
7. Write short notes on any **four** of the following : [20]  
 (a) Software Agents  
 (b) RPC and RMI  
 (c) CODA file system  
 (d) SSP chains for mobile entities  
 (e) Commit in distributed transactions  
 (f) Crash and Recovery

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Time : 3 Hrs.]

[Marks : 100

- N.B. :** (1) Questions No. 1 is **compulsory**.  
 (2) Attempt any **four** questions out of the remaining **six** questions.  
 (3) Assumption made should be **clearly stated**.  
 (4) Assume **suitable** data wherever **required** but **justify** the same.  
 (5) **Figures** to the **right** indicate **full** marks.

1. (a) What is open distributed system and what benefits does openness provide [6]  
 (b) (i) Discuss the different authentication protocols for secure communication. [8]  
 (ii) Compare distributed operating system, network operating system and Middleware [6]
2. (a) Discuss any two consistency model that uses synchronization operations. [8]  
 (b) (i) Explain how process-to-object binding take place in globe. [8]  
 (ii) Differentiate between nested and distributed transactions. [4]
3. (a) What are the different failure that can occur in RPC system? Discuss the solutions for these failures [10]  
 (b) (i) Explain what an object adapter is. [5]  
 (ii) Why weighted reference counting algorithm is more efficient than Simple reference counting? Explain. [5]
4. (a) What is CORBA? Explain general organization of CORBA system. [8]  
 (b) (i) Explain distributed algorithm for mutual exclusion. What are it's advantages over centralized algorithm? [8]  
 (ii) What is message broker? Explain. [4]
5. (a) Explain basic NFS architecture for Unix system. [10]  
 (b) Discuss the issues concerned with parameter passing in RPC. [10]
6. (a) What are the different ways to implement name resolution? Explain. [8]  
 Write it's relative advantages and disadvantages.  
 (b) (i) What is Totally-Ordered multicasting? How Lamport clock can be used to implement it? [8]  
 (ii) What are statefull and stateless servers? [4]
7. Write short notes on any **four** of the following : [20]  
 (a) CODA file system.  
 (b) Organisation of client and server in DCOM  
 (c) Firewall  
 (d) Message Logging.  
 (e) Code migration in D'Agents.

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- N.B. :** (1) Questions No. 1 is **compulsory**.  
 (2) Attempt any **four** questions out of the remaining.

1. (a) What is open distributed system and what benefits does openness provide ? [6]  
 (b) Discuss the different authentication protocols for secure communication. [8]  
 (c) Compare distributed operating system, network operating system and middleware based distributed system. [6]
2. (a) What is transparency ? Discuss transparency w.r.t. distributed systems. [10]  
 (b) Explain the working of any two physical clock synchronization algorithms. [10]
3. (a) Explain the working of any one centralized mutual exclusion algorithm. [10]  
 (b) Explain synchronization w.r.t. distributed systems. [10]
4. (a) Explain the communication system w.r.t. distributed computing. [10]  
 (b) Explain attacks and security in a distributed system. [10]
5. (a) Explain a deadlock detection algorithm for distributed system. [10]  
 (b) Explain the use and working of CORBA. [10]

6. (a) What are the issues in distributed file system design ? Explain and give one example. [10]  
 (b) What are statefull and stateless servers ? [10]  
 Explain data and code migration and replication w.r.t. distributed systems.
7. Write notes on **any four** of the following : [20]  
 (a) Software Agents  
 (b) CODA file system  
 (c) Firewall  
 (d) Message Logging  
 (e) Commit in distribute transactions  
 (f) Crash and Recovery

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### Distributed Computing – May 2007

Time: 3Hrs.]

[Marks : 100

- N.B.:** (1) Question No.1 is **compulsory**.  
 (2) Attempt any **four** questions out of the remaining questions.  
 (3) Assumptions made should be **clearly** stated.  
 (4) **Figures** to the **right** indicate **full** marks.  
 (5) All questions carry equal marks.

1. (a) What are the goals of a distributed system ? [6]  
 (b) Compare multi-computer system with multi-processor systems. [6]  
 (c) What are various services provided to network operating system by middleware for designing a distributed system ? [8]
2. (a) What does one understand by an object reference ? How is object reference passed as parameter in RMI. [6]  
 (b) What are various forms of message-oriented communication ? Applications such as E-mail, Chat, Newsgroup, Web-meeting, SMS use which communication model. [6]  
 (c) Compare processes and threads. Explain user and kernel level threads execution and also the need of light weight threads. [8]
3. (a) Explain the problem of distributed commit. Explain Two-phase commit protocol in detail. [6]  
 (b) "Vector Timestamp mechanism for synchronization is used for capturing causality of events." Justify the statement by using an example of distributed application which requires such synchronization. [8]  
 (c) What issues of parameter passing need to be considered while designing marshalling/un-marshalling mechanism in RPC/RMI ? [6]
4. (a) What is CORBA ? Explain its architecture and various services provided by it. [10]  
 (b) Explain the need of Client Centric consistency models as compared Data Centric consistency models. Explain any 2 client centric models with the along applications which require to use them. [10]
5. (a) Explain distributed algorithm for Mutual Exclusion. What are the advantages and disadvantages of it over centralized algorithm. [6]  
 (b) Explain the epidemic protocols for update propagation in eventual consistent data store. [6]  
 (c) Explain CODA File System. [8]
6. (a) Explain failure semantics in RMI. [5]  
 (b) Explain why weighted reference counting algorithm is more efficient than simple reference counting. [5]  
 (c) What are message brokers ? [5]  
 (d) What are the security issues in mobile code? [5]
7. Write any four short notes : [20]  
 (a) Garbage Collection in distributed system.  
 (b) Peer to Peer Model as compare to Client-Server Model.  
 (c) Mobile Agents for Code migration.  
 (d) Name resolution in DNS.  
 (e) Distributed vs. Nested Transactions.

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### Distributed Computing – December 2007

Time: 3 Hrs.]

[Marks : 100

- N.B.:** (1) Question No.1 is **compulsory**.  
 (2) Attempt any **four** questions out of the remaining **six** questions.

1. (a) Compare Multi Computer Systems with Multi Processor systems. [10]  
 (b) Explain Socket Programming Primitives for connection Oriented Transport layer service. [10]
2. (a) What are the various forms of Message – Oriented Communication? Give example of each. [10]  
 (b) Explain Attacks and Security threats in a distributed system? [10]
3. (a) Explain Code Migration and the role of Mobile agents. [10]  
 (b) Explain the process of Remote Method Invocation using stubs/proxy/skeleton. [10]

4. (a) Compare Data–Centric and User Centric Consistencies and explain one consistency model of each type. [10]  
(b) What is Totally–Ordered Multi casting ? How Lamport Clock is implemented ? [10]
5. (a) What is CORBA ? Explain general architecture of CORBA. [10]  
(b) Explain architecture of DNS and also Name Resolution in DNS. [10]
6. (a) Explain Distributed algorithm for Mutual Exclusion. What are they advantages and the [10]  
disadvantages of it over Centralized algorithms ?  
(b) Compare NOS with DOS. [10]
7. Write any four short notes : [20]
  - (a) NFS File System
  - (b) Crash and Recovery
  - (c) Proxy and Firewall
  - (d) Object Adaptor
  - (e) Message Logging

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### Distributed Computing – May 2008

Time: 3 Hrs.]

[Marks : 100

- N.B.:**
- (1) Question No.1 is **compulsory**.
  - (2) Attempt any **four** questions out of the remaining questions.
  - (3) Assumptions made should be **clearly** stated.
  - (4) **Figures** to the **right** indicate **full** marks.
  - (5) **All** questions carry **equal** marks.

1. (a) Compare and contrast multicomputers with multiprocessors. [10]  
(b) What are the middleware services offered to the distributed system? [10]
2. (a) Explain the architecture of Message–Queuing system. [8]  
(b) What are the advantages of using threads over processes? [6]  
(c) Justify “Weighted Reference counting is more efficient to simple reference counting.” [6]
3. (a) Explain the issues related to migrating Resource Segment in process migration. [10]  
(b) What is the need of determining Global State? Explain the process in detail. [10]
4. (a) Explain the need of 3-phase commit. [8]  
(b) What is CORBA? Explain the architecture. [8]  
(c) Suggest methods of masking client crashes in a distributed system. [4]
5. (a) Explain the process of Concurrency Control using pessimistic and optimistic Time Stamp Ordering. [10]  
(b) Explain Election algorithms for selecting co-ordinator. [10]
6. (a) Explain different steps involved in electronic payment for credit card transaction using SET [10]  
protocol in an E-Commerce application.  
(b) Explain Client Centric Consistency models and explain the difference in each. [10]
7. Write any two short notes on : [20]
  - (a) CODA file system
  - (b) Name Resolution in DNS
  - (c) Parameter Passing in RMI

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### Distributed Computing – December 2008

Time: 3 Hrs.]

[Marks : 100

- N.B.:**
- (1) Attempt any **five** questions.
  - (2) **Figures** to the **right** indicate **full** marks.
  - (3) **All** question carry **equal** marks.

1. (a) Compare Multi Computer Systems with Multi Processor systems. [10]  
(b) What are the various forms of Message-Oriented Communication ? Give example of each. [10]
2. (a) Explain code Migration and the role of Mobile agents ? [10]  
(b) Explain the process of Remote Method Invocation using stubs/proxy/skeleton. [10]
3. (a) What is Totally Ordered Multicasting ? How Lamport Clock is implemented ? [10]  
(b) Explain architecture of DNS and also Name Resolution. [10]
4. (a) Explain Distributed algorithm for Mutual Exclusion. What are its advantages/disadvantages over [10]  
Centralized algorithms ?  
(b) Compare NOS with DOS and middleware. [10]
5. (a) Explain Vertical and Horizontal services of CORBA. [10]  
(b) Explain the difference between Data Centric and Client Centric Consistency Models. Explain one [10]  
scheme of each.

6. (a) What is failure semantics explain wrt to RMI ? [10]  
 (b) Explain how Distributed Transaction Management is achieved. [10]
7. Write short notes on (any **four**) : [20]  
 (a) SSP chains for Mobile Entities  
 (b) Issues in Parameter Passing in RMI/RPC  
 (c) Process Vs. Thread  
 (d) CODA File Systems  
 (e) Object Adapter

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### Distributed Computing – December 2009

Time: 3 Hrs.]

[Marks : 100

- N.B. :** (1) Question No. 1 is **compulsory**.  
 (2) Attempt any **four** questions out of remaining **six** questions.  
 (3) **Figures** to the **right** indicate **full** marks.  
 (4) All questions carry **equal** marks.

1. (a) Compare NOs with Dos. [10]  
 (b) Discuss clock synchronization mechanism in distributed operating system. [10]
2. (a) Compare and contrast the usefulness of stateless server with a stateless server. Highlight their application areas. [10]  
 (b) Explain any algorithm designed to provide mutual exclusion in a distributed environment. [10]
3. (a) Explain clearly, with the help of suitable diagram, how RPC is implemented. [10]  
 (b) Explain, what are possible failures that can happen during RPC. [10]
4. (a) Explain with example, threads and processes. Discuss differences and similarities between threads and processes. [10]  
 (b) Explain marshalling / unmarshalling mechanism in RPC/RMI. [10]
5. (a) Explain locating mobile entities in detail. [10]  
 (b) Explain the goals of distributed system. [10]
6. (a) Explain commit in distributed transaction. [10]  
 (b) What is CORBA? Explain its architecture and various services provided by it. [10]
7. Write detailed notes on (any **four**) : [20]  
 (a) CODA file system  
 (b) Code Migration  
 (c) Security mechanism in distributed system  
 (d) Sun network file system  
 (e) Crash and Recovery

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