

Total No. of Questions : 12]

B.E IT Sem-II

May-June-2012

SEAT No. :

P1478

[Total No. of Pages : 3

[4164] - 731

**B.E. (Information Technology)**

**DISTRIBUTED SYSTEMS**

**(Sem. - II) (2008 Pattern)**

*Time : 3 Hours]*

*[Max. Marks : 100*

*Instructions to the candidates:-*

- 1) Answer question 1 or 2, 3 or 4 and 5 or 6 from Section - I and question 7 or 8, 9 or 10 and 11 or 12 from Section - II.
- 2) Answers to the two sections should be written in separate answer sheet.
- 3) Neat diagrams must be drawn wherever necessary.
- 4) Figures to the right indicate full marks.
- 5) Assume suitable data, if necessary.

**SECTION - I**

**Q1)** a) Following are the classical set of assumptions made by developers in distributed systems. [8]

- i) The network is reliable.
- ii) Latency is zero.
- iii) Bandwidth is infinite.
- iv) The network is secure.

Discuss why these assumptions maybe wrong. Justify these assumptions may not always true while designing the real distributed systems.

- b) List the main software components that may fail when a client process invokes a method in a server object. Suggest how the components can be made to tolerate one another's failures? [8]

OR

**Q2)** a) What is marshaling? List out the different approaches of external data representation and discuss each approach in detail. [8]

- b) The Internet enables users to access services and run application over a heterogeneous collection of computers and networks. How to apply heterogeneity for networks, computer hardware, operating systems and programming languages in distributed systems. [8]

P.T.O



- Q3) a) Write a C function for adding two integers and call it using RPC and identify the contents generated by stub. [6]  
b) Explain the purpose of following with respect to RMI. [6]  
i) Dispatcher  
ii) Reflection and  
iii) Registry in RMI  
c) State and explain the Invocation models supported in CORBA. [6]

OR

- Q4) a) List and explain the steps involved in doing remote computation through RPC. [6]  
b) Compare static and dynamic remote method invocation with the help of suitable example. [6]  
c) Explain Message Queuing model with suitable example. [6]

- Q5) a) Discuss following with an examples : [8]  
i) Logical Clock  
ii) Physical Clock and  
iii) Clock Skew  
b) Write Lamport's time stamp algorithm in pseudo C and explain it with suitable example. [8]

OR

- Q6) a) Write Bully algorithm for electing a coordinator in pseudo C and explain it with suitable example. [8]  
b) List and compare various algorithms used to achieve Mutual exclusion in a Distributed Systems with respect to. [8]  
i) Messages per entry/exit      ii) Delay before entry  
iii) Time complexity      iv) Problems

## SECTION - II

- Q7) a) List and explain the forms of transparency which have been partially or wholly addressed by current distributed file systems. [5]  
b) Describe basic NFS architecture for Unix system with the help of neat diagram. [8]  
c) What is naming service X.500? [5]

OR

- Q8) a) How does the CODA file system used for replication strategy? [5]



- b) What are different requirements and pitfalls in the design of distributed file system? Explain any four requirements. [8]
- c) How does mounting of a remote file system take place in NFS? Describe the functionality of an auto-mounter in NFS. [5]

**Q9)** a) Consider the following set of concurrently executing processes

**P1**

**P2**

**P3**

x=1;

y=1;

z=1;

print (y, z);

print (x, z);

print (x, y);

Is 001110 a legal output for a sequentially consistent memory? Explain your answer. [5]

- b) Explain following consistency models with suitable examples :
  - i) Causal
  - ii) FIFO [6]
- c) Describe object replication and scaling technique in distributed shared memory systems. [5]

OR

**Q10)** a) How does granularity affect DSM system performance? [5]

- b) Explain following consistency models with suitable examples : [6]
  - i) Strict
  - ii) Entry
- c) What kind of consistency would you use to implement an electronic stock market? Justify your answer. [5]

**Q11)** a) Describe at-least-once and at-most once semantics in detail. For each of the following applications do you think at-least-once semantics or at-most once semantics is best? Discuss. [8]

- i) Reading and writing files from a file server.
- ii) Compiling a program.
- b) What is recovery line? Draw and explain domino effect in detail. [8]

OR

**Q12)** a) In a fault tolerant distributed system how check-pointing is used. Describe following check-pointing : [8]

- i) Independent check-pointing
- ii) Coordinated check-pointing
- b) Consider a Web browser that returns an outdated cached page instead of a more recent one that had been updated at the server. Is this a failure, and if so, what kind of failure? [4]
- c) Draw and explain triple modular redundancy. [4]

