

Arab Academy For Science and Technology & Maritime Transport
College of Engineering & Technology
Computer Engineering Department

EXAMINATION PAPER – Week 12

Course Title: Distributed and Parallel Systems

Course Code: CC755

Date: Fri. May, 6-2015

Lecturer: Dr. Manal Helal

Time allowed: 2 days

Start Time: 08:00 a.m.

Student's name:

Reg.# :

Question #	Marks	
	Actual	Available
Theory		11
Sockets & RPC & RMI		6
CORBA & IDL		3
Total		20
Lecturer	Name : Dr. Manal Helal	
	Signature :	
	Date:	

MPC6/1-1

1) To achieve fault-tolerant servers are often replicated. This can be achieved according to two methods. Explain how each method is carried out.

2) Explain what we mean by distribution transparency and mention at least five kinds of transparency. Give an example that illustrates why it is not a good idea to always aim at complete distribution
Transparency

3) a) What is strict consistency? Explain why this concept works for uniprocessors, but is impossible to implement for multiprocessor machines.

b) Explain clearly what weak consistency is.

c) Weak consistency requires that a programmer indicates when the memories in a DSM (Distributed Shared Memory) system should be synchronized. To what extent is this a burden for the programmer?

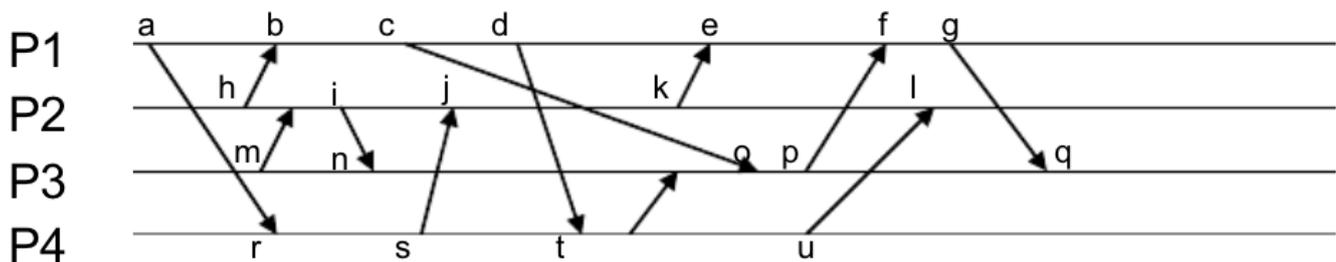
4) Explain how iterative name resolution in DNS works and why it may incur high latency costs. Also give an example where recursive and iterative resolution is effectively combined.

5) The figure below shows four processes (P_1, P_2, P_3, P_4) running events a, b, c, \dots with arrows as messages communicating between them. The logical clock values are all initialised to 0.

a. Provide the scalar Lamport timestamps f (single integer value) for each event in the Figure.

b. Provide the Vector Clock timestamps for each event shown in the Figure.

c. Is there a potential for a causal violation? Explain why.

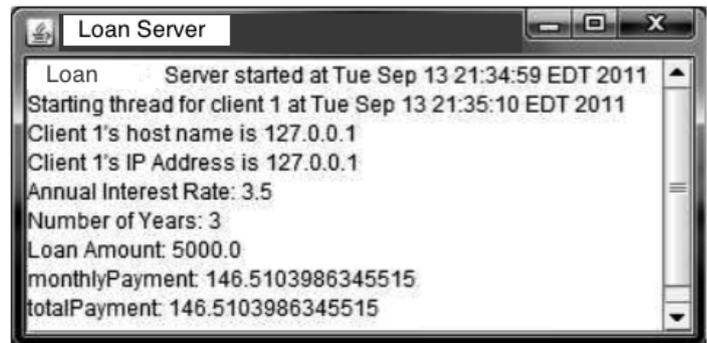


Sockets & RPC & RMI:**[6 points]**

6) Use Socket Programming to implement a *Loan server*. Write a server for a client. The client sends loan information (annual interest rate, number of years, and loan amount) to the server (see the Figure below a). The server computes monthly payment and total payment and sends them back to the client (see the Figure below b). Use the loan.java file in moodle.



(a)



(b)

7) Rewrite your solution in question 6 using RMI. You need to define a remote interface for computing monthly payment and total payment.

CORBA & IDL:**[3 points]**

8) Rewrite your solution in question 6 using CROBA & IDL.