

Distributed Systems

academic year 2004/05

Question Give a definition of heterogeneity, explain why it is important to consider in the context of a distributed system and provide an example.

Question What is the difference between a thin client and the use of mobile code (e.g., a Java Applet).
What are the advantages and drawbacks of each approach?

Question Why is marshalling and unmarshalling necessary for interprocess communication? Give an example of a marshalling.

Question What is the role of the skeleton in the Remote Method Invocation architecture?

Question A remote object reference is composed of the following fields

Internet address	port number	time	object number	interface of remote object
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Explain what is the role of each field in referencing a remote object.

Question In the NFS file system, why does each client maintain a table of mounted file systems holding the following information?

Internet address	port number	file handle
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Question Does a DNS server hold all mappings between names and IP addresses? If yes, what happens when a server goes down? If not, how many interactions are necessary to resolve a name in the best and in the worst cases?

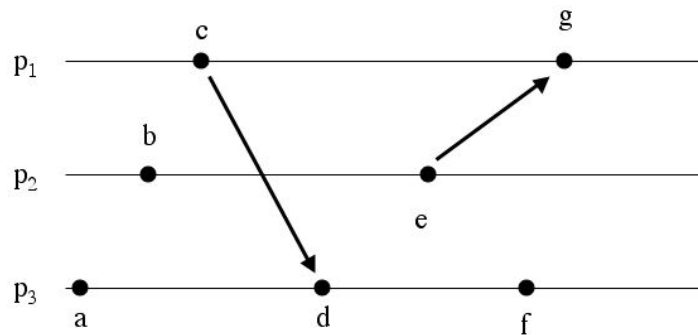
Question At the same real time instant 12/4/05 9.30.26.986 AM the reading of the clocks on two different machines are:

Machine 1	Machine 2
12/4/05 9.30.27.125	12/4/05 9.30.25.598

What is the clock skew?

What would happen after external synchronization?

Question Given three processes p_1, p_2 and p_3 , events c, g occurring at p_1 , b, e occurring at p_2 and a, d, f occurring at p_3 as depicted in the following figure, where real time flows from left to right and arrows represent message exchange



consider Lamport's logical clocks. Give all 'happened_before' relations between events. Say whether the following couple of events are parallel or not: a, b ? f, g ? b, g ?

Question Does the Ring Algorithm for distributed mutual exclusion satisfy the *safety* property? Does it satisfy the *liveness/progress* property? Prove one of the two answers.

Question Give an example involving at least two processes showing that total order is a stronger property than casual ordering in the case of multicast communication.