

--	--	--	--	--	--	--	--

Distributed Systems academic year 2007-08

Rules

- This is a closed books exam.
- The operation of any electronic device is prohibited (e.g, no calculator, phone or PDA).
- Detail all answers with extensive explanations.
- Write as clearly as possible, both in terms of handwriting and wording.

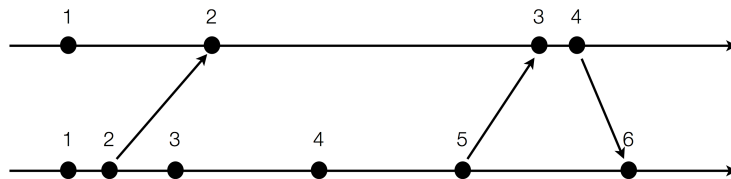
Questions

1. Why is marshaling and unmarshaling necessary for interprocess communication? Is Java serialization a form of marshaling?
2. What are the transparency requirements for a Distributed File System? How does NFS satisfy or unsatisfy them?
3. The three following readings of clocks A, B, and C with respect to the real time 0, 10 and 20 have been measured:

	Real time 0	Real time 10	Real time 20
A	0	9	18
B	1	16	31
C	0	11	22

What is the clock skew for all the clocks at all three readings? What is the drift rate of the three clocks? If at Real time 50 one externally synchronizes the clocks with bound 2, what will be the internal synchronization of the clocks?

4. Given two process with events and message exchanges as depicted in the following figure



provide an example of a consistent and of a not consistent cut. Explain and prove the answer.

5. Given four processes A, B, C, and D with logical clocks set to 12, 20, 15, and 18, respectively, consider Ricart and Agrawala's algorithm for mutual exclusion. Suppose at the same time both process B and D want to enter the critical section (see figure). What happens? Who will enter the critical section first? Is it possible that one of the two process starves? What is the bandwidth consumption of the algorithm? Is the ordering property met by the algorithm?

