

Distributed Computing Systems – Written Assignment 2

Due Date: April 30, 2007, before class. You can either hand over the assignment in class or send it to me by email. If you are emailing, the acceptable formats are MS Word, PDF and plain text. Show all steps, so that I can give partial credits.

Graduate students are required to answer all 5 questions. Undergraduates are required to answer questions 1, 2, 3 and 5.

1. Consider a communication layer in which messages are delivered only in the order that they were sent. Give an example in which even this ordering is unnecessarily restrictive. [15 points]
2. In the bully leader election algorithm, suppose two processes detect the failure of the current leader simultaneously and decide to hold an election. What happens? Explain with an example. [15 points]
3. Add a new message to Figure 5-7 in your text book that neither happens before A nor happens after A. [15 points]
4. How many failed elements (devices plus voters) can the triple modular redundancy depicted in Figure 7-2 of the textbook handle? Give an example of the worst case failure that can be masked. [15 points]
5. For each of the following applications do you think at-least-once or at-most-once semantics is the most appropriate? Explain [15 points]
 - a. Reading and writing files from a file server
 - b. Compiling a program
 - c. Remote banking