Concurrent Algorithms: Exercise Set 11

December 7, 2009

Problem 1

1. Provide an algorithm for 2-set agreement in a system with three processes, one of which might fail. (Therefore, the parameters are $n = 3$, $k = 2$, $t = 1$.) Does your algorithm contradict the lower bound of [HS, BG, SZ]? Why not?
2. Generalize your algorithm to solve $(k + 1)$-set agreement for n processes, k of which might fail.

Problem 2

Consider the *safe agreement* algorithm on Slide 11.

1. Write down the pseudocode of the algorithm in terms of registers. (Practically, you should implement the *levels* using registers.)
2. Prove that, if no process crashes while running the *propose* function, then the algorithm always terminates.
3. Provide an execution where the safe agreement algorithm does not terminate.