

Assignment 5

“Course 1-02-435: Distributed Algorithms in Network Communication”

Due July 4, 2010

1 Routing Algorithms (10 points)

Prove that the following assertions are invariants of the Chandy-Misra algorithm for computing paths towards v_0 :

$$I_0: \forall_{u,w} \langle \mathbf{mydist}, v_0, d \rangle \in M_{wu} \rightarrow d(w, v_0) \leq d$$

$$I_1: \forall_u d(u, v_0) \leq D_u[v_0]$$

2 Election Algorithms (10 points)

Give an initial configuration for the Dolev-Klawe-Rodeh algorithm for which this algorithm actually requires $\lceil \log N \rceil + 1$ rounds. Also give an initial configuration for which the algorithm requires only two rounds, regardless of the number of initiators. Is it possible for the algorithm to terminate in one round?

What to turn in by July 4, 2010 at 11:59pm

Turn in the above work:

- via Telem
- by hand
- via email to `ise435@gmail`

Draw your algorithm steps using any graphical tool of your choice. You may also submit hand drawings if they are sufficiently clear and understandable without outside help. I will accept submissions in the following formats:

- MS Powerpoint, MS Word, PDF, HTML

I will not accept collections of image files which are not viewable in a single file and with unambiguous order and labeling. You may write your proofs in English or Hebrew. If hand-written, I must be able to read the proof without outside help. You may work in groups of two. I will approve one group of three since there are an odd number of students.

Early Submission Bonus

I will give an extra 5% bonus on the grade of this assignment if it is received by me at or before **27 June 2010 at 11:59:59pm** precisely. If the submission is made after 27 June at 11:59:59pm, I will grade it normally.