

LAB EXERCISES DISTRIBUTED ALGORITHMS (IN4150)

Exercise 3c

Implementation of Election in Asynchronous Complete Networks

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1 Goal

Algorithms for election have in particular been studied for ring networks and complete networks. In this exercise the election algorithm of Afek and Gafni for asynchronous complete networks has to be implemented.

2 Assignment

Implement the the algorithm of Afek and Gafni for election in asynchronous complete networks (Algorithm 4.21 of the lecture notes). The implementation can be done in Java/RMI or Python. In designing, implementing, and testing your algorithm, take into account the following issues:

1. Your program should be truly distributed in that processes in the distributed algorithm run on multiple machines (so don't use a single JVM on a single machine that simulates all processes; it is of course allowed to have a single JVM in one machine simulate multiple processes).
2. Build into your program artificial random delays before processes perform their actions.
3. First test the correctness of your program for small networks.
4. Also test the correctness of your program when either only the final winner, or many processes start the algorithm spontaneously.
5. Try to drive the execution of your program to a number of processes that is as large as possible.

3 Report

Write a (short) report in which you list for each test case that you run:

- the numbers of capture/kill and acknowledgment messages sent/received
- the maximum levels reached by the processes
- the number of times every process is captured