

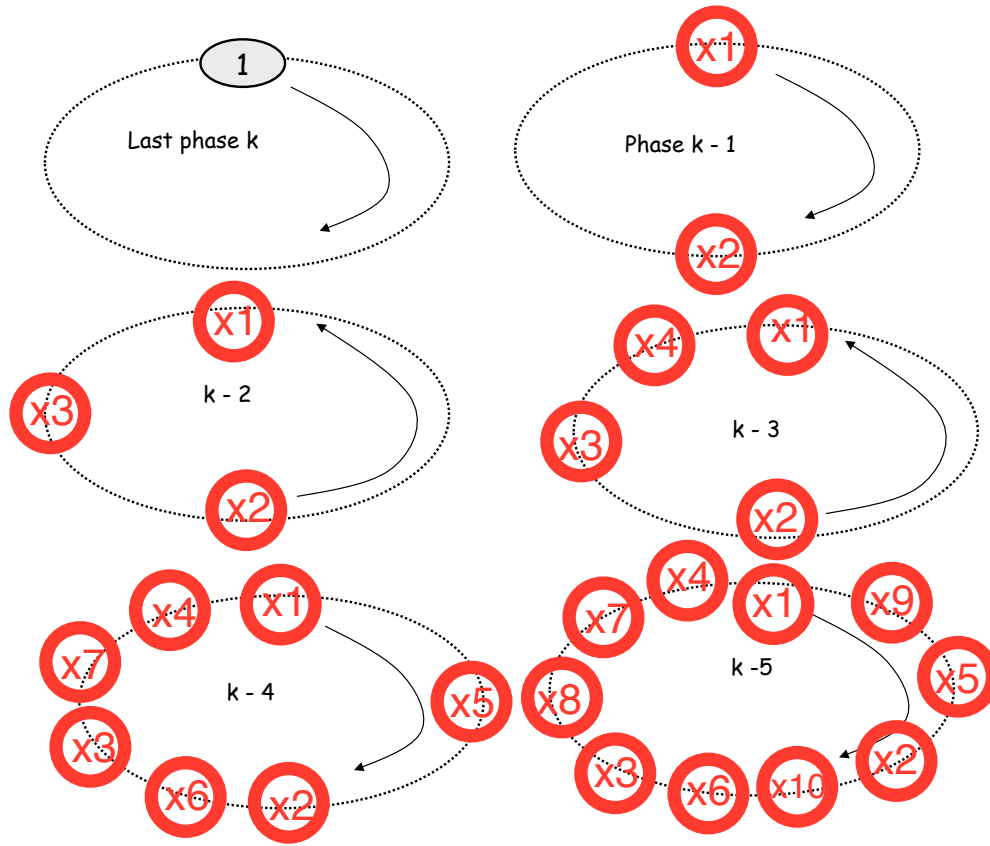
CSI5308 - Assignment 2

Part 1 due on October 27. Part 2 due on November 3.

- IMPORTANT: you must type your answers, no handwritten copies will be accepted.
- For all your algorithms: *the most efficient the solution, the better the mark.*
- In all exercises the standard set of assumptions are: total reliability, local orientation, bidirectional links. Read carefully to understand the additional assumptions and *do not use assumptions that are not given.*

PART 1: Individual - Due on October 27.

Question 1 - Algorithm ALTERNATE alternates an electoral stage to the right and one to the left. The sequence of number of candidates that minimizes the number of stages (starting from the last stage) follows the Fibonacci sequence. Consider now a modification in which the strategy is to alternate 2 stages to the right and 2 stages to the left instead of just one. Compute the minimum number of candidates in the last six stages filling the 5 empty rings in the figure below. Let $x_1, x_2, x_3, x_4, x_5, x_6$ be the numbers you computed. What is the rule to generate the next two numbers x_7 and x_8 ? Would this result in a better or worse message complexity compared with the version seen in class ? (Explain your answer).



Question 2 - Consider a tree network T where each entity has locally available a clock. Furthermore, *the clocks tick at the same time* (although they might have different initial values), and *communication delays are unitary*; that is, all messages sent at (a global) time t will arrive and be processed at time $t + 1$. Consider the following problem, called *Simultaneous Startup*: initially all entities are in state, *IDLE*; all entities must enter a special state *NOW* for the first time simultaneously (i.e., at the same global time). Any number of entities (the initiators) can spontaneously and independently start the process at any time.

1. Describe an *efficient* protocol for solving the problem.
2. Derive the message complexity of your solution as a function of the size of the network.

PART 2: Groups of at most four students - Due on November 3.

This part will be also discussed in class.

- Form a group composed by up to 4 students. Send me an email to register your group and you will receive your topic.
- Prepare a presentation of 20 minutes. Each group is given 30 minutes: 20 for the actual presentation, and 10 for questions.
- By November 3 you have to hand-in a set of commented slides for your lecture (use powerpoint or a similar software); the schedule for the actual presentation will be posted later.
- All members of the group should participate in the preparation of the whole lecture, you will then decide how to divide it among yourselves for the presentation. Everybody must present a portion of the lecture.
- The intended audience of your presentation are your fellow students in CSI5308; so you must use, as much as possible, the same terminology and language as used in class and in the textbook. Strive for clarity, simplicity and accuracy; when possible use images and examples.