Distributed Algorithms

Assignment 09

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1 Self-Stabilizing Spanning Tree Theory

- a.) if the root fails or the root are not reachable, another spanning tree with a different root node forms, else If other links or nodes fails, another spanning tree with the same root node forms; if local data structures corrupts, the node may declare itself as a root, but it will be suppressed after it receives the correct heart beat message from the original root, thus the spanning tree will stay the same; if message are lost, a timeout will occur, and the value of P_f will be decreased. If $P_f \leq 0$, this node will declare itself as a root, but it will also be suppressed after it receives the correct heart beat message from the original root, thus the spanning tree will stay the same, too.

- b.) If the topologies are changed in the self-stabilizing spanning tree, a new tree will be formed with a different root, because the root must always be the node with smallest ID.

- c.) We can use a shortest Path Algorithm to rank the topologies, so that the constructed self-stabilizing spanning tree can always have a good performance.