TECHNISCHE UNIVERSITÄT DARMSTADT

TK1: Distributed Systems - Programming & Algorithms

10. Theory Assignment
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By handing in a solution you confirm that you are the exclusive author(s) of all the materials. Additional information can be found here: https://www.informatik.tu-darmstadt.de/de/sonstiges/plagiarismus/

Task 1: Maekawa's Voting Algorithm (10P)

The following voting sets are defined for 8 processes (voting set V_i is defined for process i):

V_1: (1,2,3,4,7)
V_2: (1,2,3,5,8)
V_3: (1,2,3,6)
V_4: (1,4,5,6,7)
V_5: (2,4,5,6,8)
V_6: (3,4,5,6)
V_7: (2,4,7,8)
V_8: (1,5,7,8)

Answer the following questions:

a) Does the algorithm work correctly with these voting sets? Explain your statement, e.g., by performing the essential test steps.

b) What are the two specific fairness conditions of Maekawa's algorithm? Do they hold in this case? Explain your answer!

c) Is it possible to change the voting sets (e.g., by adding or deleting processes) such that both fairness conditions hold? If not, why? If yes, state the modified voting sets.