Session 6: Exercises

M2 MOSIG: Large-Scale Data Management and Distributed Systems

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1 About f

Question 1.1: *An algorithm A that solves problem P is proven correct for some f. What claims below are correct:*

1. *In an execution, at most f processes may crash.*
2. *In each execution f processes crash.*
3. *If more than f processes crash in an execution, algorithm A may not solve problem P.*
4. *If less than f processes crash in an execution, algorithm A may not solve problem P.*

2 Univalent configuration

Question 2.2: *Give an example of a univalent configuration for the* FloodSet *consensus algorithm (Algorithm 4).*

Question 2.3: *In OTR consensus algorithm (Algorithm 6), can a configuration be univalent before GSR?*

Question 2.4: *In OTR consensus algorithm (Algorithm 6), can an initial configuration, where not all the initial values are identical, be univalent? If yes, give an example. If no, explain why?*

3 More about OTR

All the following questions are about OTR (Algorithm 6)

Question 3.5: *Let condition $f < n/3$ hold, but assume an execution where more than f processes crash. Which property of consensus is violated in such an execution? Give an example.*

Question 3.6: *Conversely, assume an execution with no more than f processes crash, but $f \geq n/3$. Which property of consensus is violated in such a execution? Give an example.*