

Exercise 2

Problem 1. Consider the transformation from SRSW regular to SRSW atomic registers given in class. Prove that if you replace the base registers (SRSW regular registers) by MRSW regular registers, your algorithm does *not* yield an MRSW atomic register (by providing a counterexample that breaks atomicity).

Problem 2. Consider the transformation from SRSW atomic to MRSW atomic registers given in class. Show that the transformation doesn't work with multiple writers.

(Show that if we replace SRSW atomic registers with SRMW atomic registers in the transformation, we do *not* obtain a MRMW atomic register)

Problem 3. Consider the transformation from binary MRSW regular to M-valued MRSW regular explained in class. Does the same transformation work for binary MRMW regular to M-valued MRMW regular registers?

You can use the following generalization for regular registers with multiple writers. When considering the read operation of a MRMW regular register, a valid value can be either:

- any value v written by a concurrent write operation.
- any value v written by the latest starting and completed write operation¹, or any operations concurrent with it.

Note: the notion of regular registers is not well defined in the case of multiple writers. Thus, the last problem is not in the scope of the exam, and is only left as practice.

¹By this, we mean the write operation with the latest starting point that has returned before the read in question started.