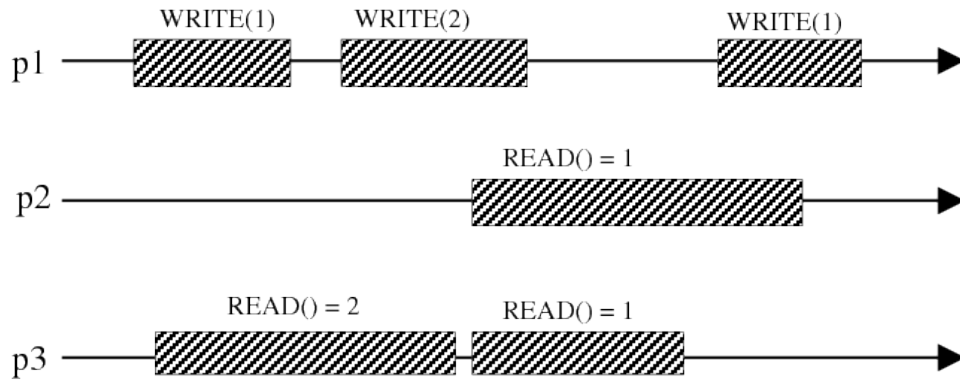


Exercise 1

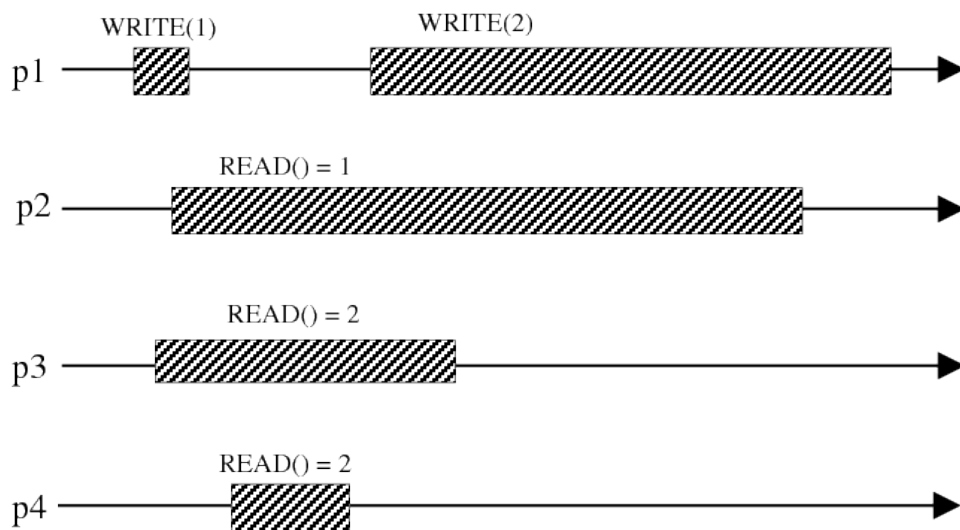
**Problem 1.** Each of the following executions represents a run of an algorithm that implements a read/write register. For each execution:

- Specify whether the execution is: *atomic*, *regular*, *safe*, or *none-of-the-above*. Explain why this is the case.
- If the execution is atomic, draw in the serialization points.

**Part 1.a.**

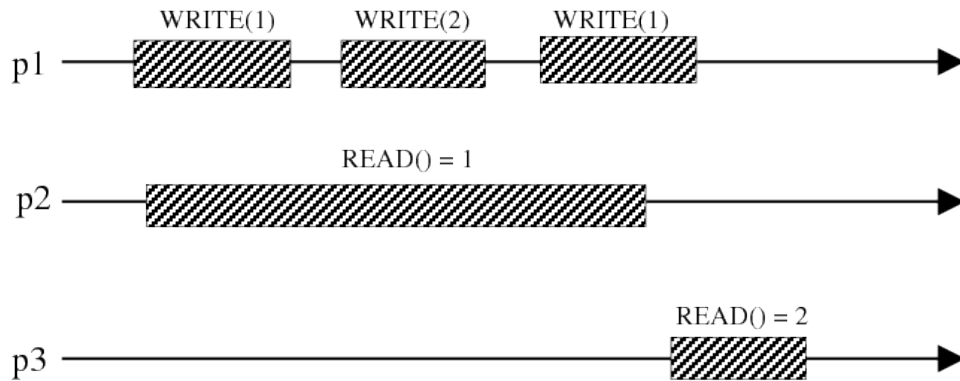


**Part 1.b.**



Part 1.c.

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**Problem 2.** Consider the transformation from binary MRSW safe registers to binary MRSW regular registers, given in class. Prove that the transformation does **not** generate multi-valued MRSW regular registers (by providing a counterexample that breaks regularity). Also, prove that the resulting registers are not binary atomic (by providing a counterexample that breaks atomicity).

**Problem 3.** Consider the transformation from binary regular to M-valued MRSW regular registers given in class. Prove that:

1. The resulting registers are regular.
2. The transformation would not work if the Write operation would first write 0, and then 1. (You should provide a counterexample that breaks regularity.)
3. The resulting registers are not atomic. (You should provide a counterexample execution that breaks atomicity.)