

# Modeling Concurrent and Probabilistic Systems

Winter Term 07/08

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## — Series 5 —

Hand in until November 23 before the exercise class.

### Exercise 1

(4 points)

Use the partitioning algorithm as introduced in the lecture to show that the two specifications of the two place buffer are both weakly bisimilar and observationally congruent!

### Exercise 2

(6 points)

Prove the following characterization of weak bisimilarity in terms of observational congruence:  
For every  $P, Q \in Proc$ ,

$$P \approx Q \iff P \simeq Q \text{ or } P \simeq \tau.Q \text{ or } \tau.P \simeq Q.$$

### Exercise 3

(4 points)

Show that it is generally undecidable whether two given processes are weakly bisimilar or not!

*Hint:* This can be done by providing a reduction from the halting problem of Turing machines to the bisimilarity problem, employing the construction from Exercise 4.2.