



# Theoretical Foundations of the UML SS 2016

## — Series 7 —

Hand in until June 23 before the exercise class.

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### Exercise 1 (Intuition for Formal Definitions) (4 Points)

For each of the four “constraints on state labelling”-properties from Lecture 13, Slide 12 provide an intuition, i.e. in your own words give a high-level description of what each of the properties expresses and why it is needed.

### Exercise 2 ( $\forall$ -Bounded CFMs and Regularity) (4 Points)

*Formally* prove that for any  $\forall$ -bounded CFM  $\mathcal{A}$  the language  $\mathcal{L}(\mathcal{A})$  is regular.

### Exercise 3 (Short Answers) (2 Points)

State whether the following statements are true or false and give a *short but precise* explanation why (i.e. “Yes” or “No” is not sufficient):

1. Any locally communication-closed MSG is communication closed.
2. Any communication-closed MSG is locally communication closed.
3. Any MSG  $G$  with regular  $Lin(G)$  is communication closed.
4. For any locally communication-closed MSG  $G$  the language  $Lin(G)$  is regular.