

Theoretical Foundations of the UML SS 2016

— Series 6 —

Hand in until 16th June before the exercise class

Exercise 1 (Decision problem of deadlock-free CFM) (3 Points)

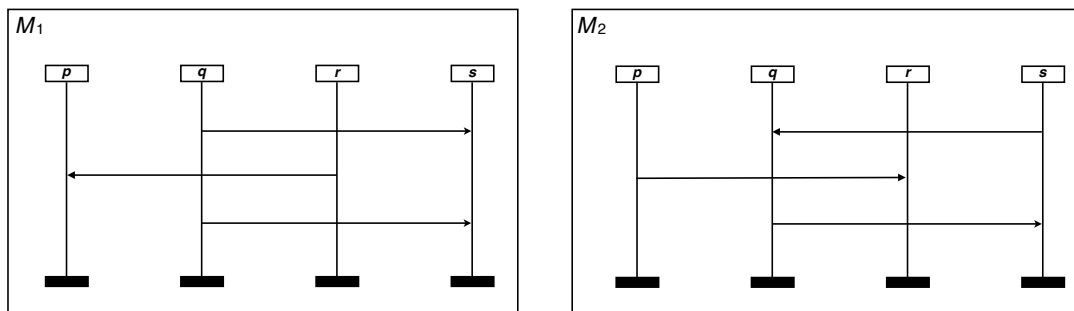
Show that: Given a $B \in \mathbb{N}$, it is decidable whether a deadlock-free CFM is \forall -B bounded.

Exercise 2 (Deterministic CFM) (2 Points)

Show that the deterministic CFMs are strictly less expressive than CFMs.

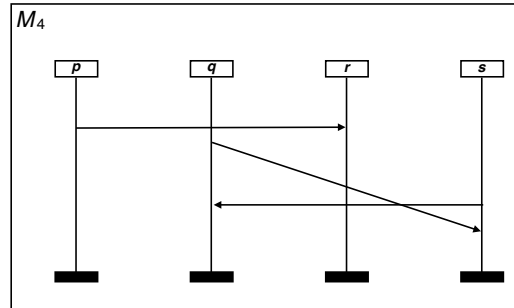
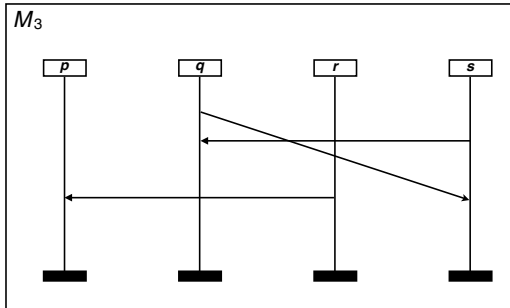
Exercise 3 (Realizability) (5 Points)

I. Two MSCs M_1 and M_2 are given as follows:



Is the language $Lin(M_1) \cup Lin(M_2)$ closed under \models ? If not, please modify M_1 or M_2 by adding only a pair of events, such that the $Lin(M_1) \cup Lin(M_2)$ is closed under \models . Please justify your answers.

II. Two MSCs M_3 and M_4 are given as follows:



Is the language $Lin(M_3) \cup Lin(M_4)$ closed under \models and \models^{df} ? Justify your answers.