Prof. Dr. Ir. Joost-Pieter Katoen

Souymodip Chakraborty, Hao Wu

– Assignment 4 –

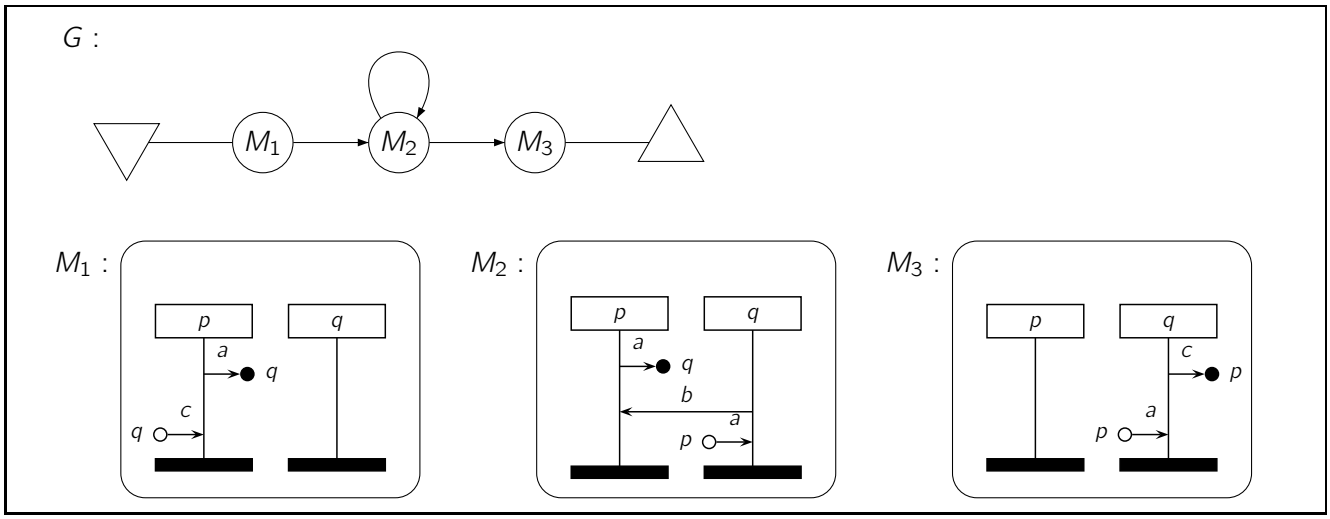
Exercise 1 (3 points)

Formally prove or disprove the correctness of the following statements for **CMSGs**:
(here, $M_i \in \mathbb{CMM}$, $i \in \{1, 2, 3\}$; $|$ stands for *choice*, $\bullet$ for *(weak) concatenation*, and * for *iteration*)

1. $(M_1 \bullet M_2)|M_3 = (M_1|M_3) \bullet (M_2|M_3)$
2. $(M_1|M_2) \bullet M_3 = (M_1 \bullet M_3)|(M_2 \bullet M_3)$
3. $M_1^*|M_2^* = (M_1|M_2)^*$

Exercise 2 (3 points)

Given a **CMSG** G as follows:



Construct a pushdown automaton for channel p to q in G and check whether all accepting paths of G are safe.

Exercise 3 (4 points)

Given an MSC M with n events and k processes and an automaton A of size m (i.e. the number of states is m).
Prove that: the decision problem whether a $L(M) \cap L(A) = \emptyset$ can be solved in time $\mathcal{O}(m \cdot n^k)$, and is *coNP-complete*.