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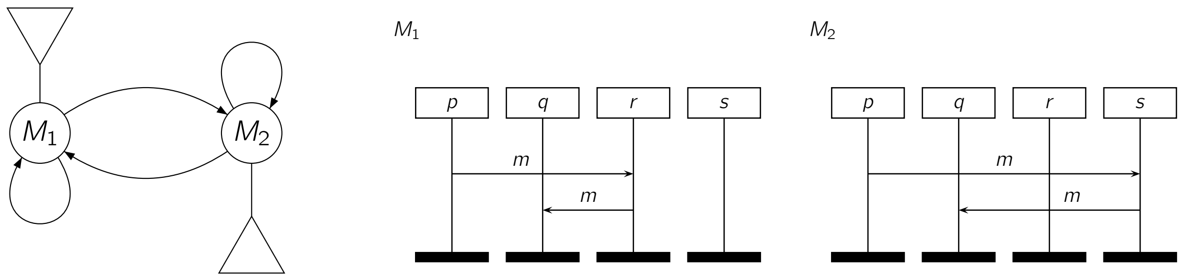
– Assignment 7 –

Exercise 1 **(4 points)**

Let MSG G be given as follows:



1. Check whether G is locally communication-closed;
2. Find a CFM $\mathcal{A}$, such that $L(\mathcal{A}) = L(G)$.

Exercise 2 **(3 points)**

Let A be a CFM on alphabet Act and $\sim_{\mathcal{A}} \in Act^* \times Act^*$ be an equivalence relation defined by:

$$w \sim_{\mathcal{A}} v \quad \textit{iff} \quad \forall\, u \in Act^* : w{\cdot}u \in L(\mathcal{A}) \iff v{\cdot}u \in L(\mathcal{A}).$$

Prove that, the quotient set of equivalence classes $Act^*/\sim_{\mathcal{A}}$ is finite *iff* CFM A is $\forall-$bounded.

Exercise 3 **(3 points)**

Given a set of MSCs $\mathcal{M} = \{M_1, \ldots, M_n\}$, an MSC M is said to be implied by $\mathcal{M}$ if for every process $p \in \mathcal{P}$, there is an MSC $M' \in \mathcal{M}$ such that $M' \upharpoonright_p = M \upharpoonright_p$. The closure of $\mathcal{M}$ is then defined as:

$$Cl(\mathcal{M}) := \{M \mid M \text{ is implied by } \mathcal{M}\}.$$

Prove or disprove: if $\mathcal{M}$ is $\forall-$*bounded*[1], then its closure $Cl(\mathcal{M})$ is also $\forall-$*bounded*.

[1] A set of MSCs is said to be $\forall-$bounded, if every MSC in it is $\forall-$bounded.