Concurrency Theory (WS 2016) Out: Thu, 08 Dec Due: Wed, 14 Dec

Exercise Sheet 7

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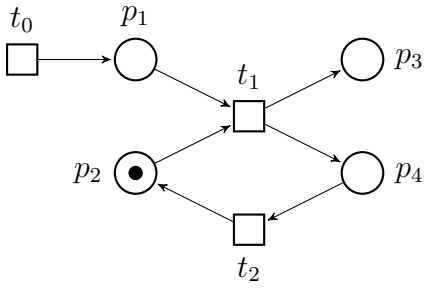
Problem 1: Complements of downward-closed sets

Let $(Q, \leq)$ be a qo and $B \subseteq Q$. Show that $\overline{B\downarrow}$ is upward-closed.

Problem 2: Backwards search for Petri nets

a) Give an algorithm to compute minpre for Petri nets. Argue about its correctness.

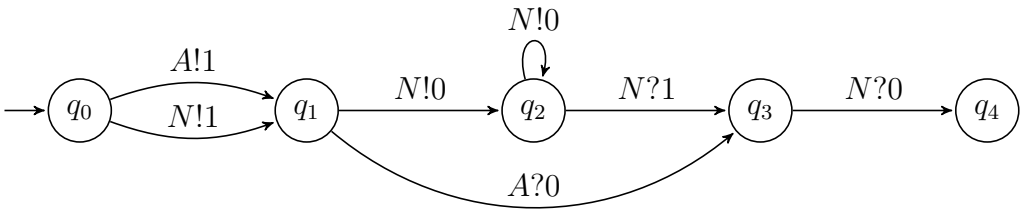
b) Consider the following Petri net:



Run the backwards search to prove that the marking $M = \begin{pmatrix} 0 & 0 & 2 & 0 \end{pmatrix}$ is coverable.

Problem 3: Backwards search for LCS

Consider the LCS depicted in the figure below.



Determine if configurations $(q_4, \begin{bmatrix} 0 \\ \varepsilon \end{bmatrix})$ and $(q_4, \begin{bmatrix} \varepsilon \\ 1 \end{bmatrix})$ are coverable using the known procedure.

N entry ↓ ↑ A entry

Problem 4: Reduction of Boundedness

We call a LCS *bounded* if its configuration space is finite.

Reduce boundedness of reset nets to boundedness of LCS, i.e. given a reset net R, construct a LCS S_R such that R is bounded iff S_R is bounded. Argue correctness of the construction.