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Advanced Information Systems
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7. Exercise Sheet: Colored Petri-Nets

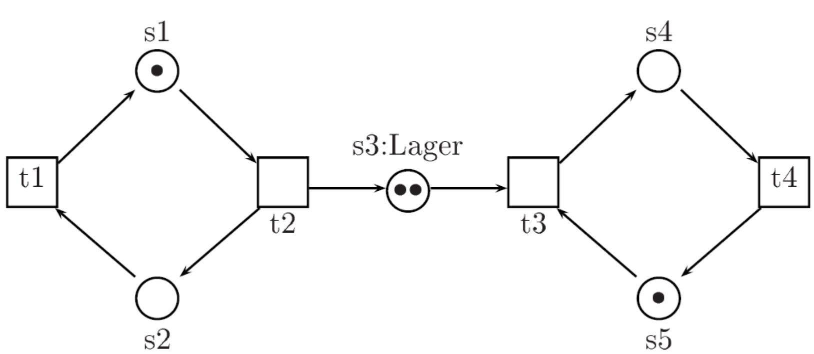
Submission: 04.08.2011
Discussion: 04.08.2011

Submission Guidlines: We will discuss the solutions to the exercise sheet on 04.08.2011. If you want to have comments on your solutions you can submit them after the lesson.

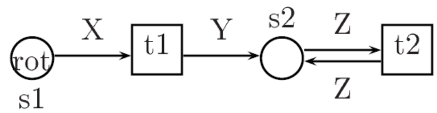
Exercise 1 (Petri-net modelling)
A small model railway has a circular track with two trains a and b, which move in the same direction. The track is divided into seven different sectors $S = \{s_1, \ldots, s_7\}$. At the start of each sector a signalpost indicates whether a train may proceed or not.
To allow a train to enter a sector s_i it is required that this sector and also the next sector are empty.

a) Describe the train system by a eS-net. Each sector s_i may be represented by three places O_{ia} (sector s_i occupied by a), O_{ib} (sector s_i occupied by b) and E_i (sector s_i is empty).
b) Describe the same system by a colored Petri-net where each sector is described by two places O_i (sector s_i is occupied) and E_i (sector s_i is empty).
c) Now use only two places O and E.

Exercise 2 (Folding of Petri-nets)
Fold the following eS-net (producer-consumer) such that it has only one place and one transition:



Exercise 3 (Unfolding of colored Petri-nets)
Unfold the following colored Petri-net:



$$\begin{aligned} C(s_1) &= \{rot\} \\ C(s_2) = C(t_1) = C(t_2) &= \{blau, gelb\} \\ X(blau) = X(gelb) &= rot \\ Y(blau) &= 2 \cdot blau + gelb \\ Y(gelb) &= 3 \cdot gelb \\ Z(blau) &= blau \\ Z(gelb) &= gelb \end{aligned}$$

Hint: C maps each place/transition to a set of "colors", i.e. a blue t_1 is different from a yellow t_1.