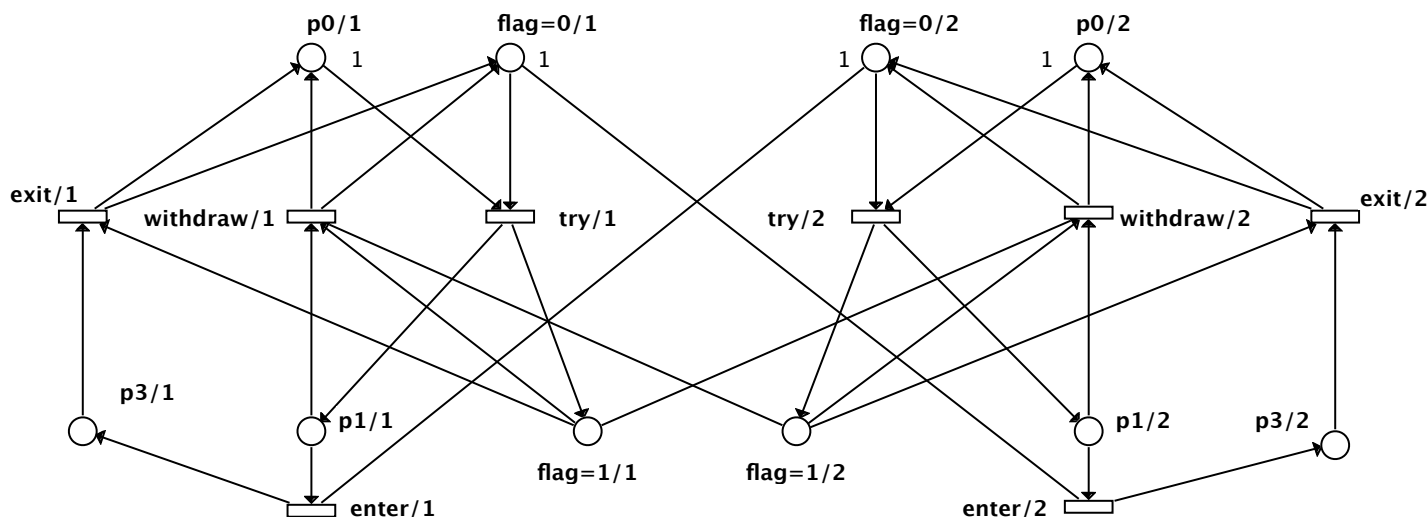


Introduction

This Model form is a short description of the A variant of Dekker's algorithm for mutual exclusion model that comes, for the Model Checking Contest @ Petri Nets, with: a set of PNML files, a set of properties to be checked (possibly one file per model instance) and an optional set of properties concerning the model (invariants, etc. – possibly one file per model instance). For Coloured Nets, equivalent PNML P/T net files are proposed too.

A variant of Dekker's algorithm for mutual exclusion



Presentation

Description: A 1-safe Place-Transition net representing a variant of the Dekker's mutual exclusion algorithm for $N > 2$ processes. Each process has three states, $p0$, $p1$, and $p3$. $p0$ is initial. From there, the process executes **try** and raises its **flag**, reaching $p1$. In $p1$, if at least one of the other process has a high **flag**, it **withdraws** its intent and goes back to $p0$. In $p1$, it **enters** the critical section if all other process' **flag** is zero. From $p3$, the process can only **exit** the critical section.

Mutual exclusion and deadlock-freedom is guaranteed. Unfair runs are however possible.

The models grows with the number of processes (N):

- $5 \times N$ places,
- $3 \times N + (N - 1) \times N$ transitions,
- arcs evolutions grows in $O(n^2)$.

Origin: <https://code.google.com/p/cunf/source/browse/tools/mkdekker.py>

Scaling parameter

Name	Description	Values
N	Number of process	10, 15, 20, 50, 100, 200

Information about the Model

Stated Properties

Data on the Model

Number of places	Number of transitions	Number of arcs	Scaling parameter value
20	16	72	2

safe	✓	free choice	✗	event graph	✗
deadlock	✗	state machine	✗	reversible	✓

Other Properties (not mandatory)

For any n , the net has no reachable deadlocked marking. No reachable marking covers any two places $p_{3/i}$, $p_{3/j}$ with $i \neq j$ and $i, j \in \{1, \dots, n\}$.